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CONTENTS *for* NOVEMBER-DECEMBER, 1942

ORIGINAL ARTICLES

Chemotherapy as Related to Surgery. *Arnold S. Jackson, Madison, Wisconsin* 451

Castless Ambulatory Method of Treating Fractures. *Roger Anderson, Seattle, Washington* 458

Object and Value of Pre-operative and Post-operative X-ray Treatment. *G. E. Pfahler, Philadelphia, Pennsylvania* 464

Myometrectomy. *Carlos R. Cirio, Buenos Aires, Argentina* 477

Recent Developments of Biliary Surgery. *Otto De Muth, Vancouver, B. C.* 481

Suprarenal Surgery in Relation to Diabetes Mellitus. *Manuel A. Manzanilla and Francisco F. Garcia, Mexico, D. F.* 495

Individual Audiograms *versus* Mass-Testing as a Means of Detecting the Hard-of-Hearing. *Sol Malis, Los Angeles, California* 498

Pituitary Gland Transplantation. *Georg Wolfsohn, Jerusalem, Palestine* 508

The Rôle of a New Obstetric Delivery Forceps in Mortality. *Frank A. La Breck, Eau Claire, Wisconsin* 514

Pneumatic Rupture of the Intestine. *A. J. Guzzetta, Rochester, New York* 522

X-rays in Identification. *Alfredo G. Garcia, Havana, Cuba* 524

Organization of the Medical Department of the United States Army. *Brig. Gen. O. H. Quade* .. 526

EDITORIALS

Wound Healing—Hypoproteinemia. *W. J. Carson* 530

Use of Cutis Graft in General Surgery. *J. E. Cannaday* 531

Prognosis in Prostatic Carcinoma. *A. J. Wolbarst* 532

Book Reviews 534

Index to Journal 536

Index to Advertisers ..... Inside Back Cover

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Chemotherapy as Related to Surgery†*

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MADISON, WISCONSIN

MANY brilliant episodes have marked the development of modern surgery but none has equalled the spectacular contribution of chemotherapy. No single factor has played as important a rôle in lowering mortality and reducing surgical complications in the period of time it has been used as has chemotherapy. While the subject is still a question for strong disagreement, most of the argument centers around the relative value of the different members of the sulfonamide group rather than on the effectiveness of chemotherapy. True, many papers have called attention to dangerous sequelæ following the administration of the sulfonamides, but their judicious use in conjunction with surgery has resulted in very few complications.

From April, 1941, to July, 1942, sulfathiazole has been used in all major and minor surgical procedures on my service (370 major and 128 minor operations) and two minor sequelæ have occurred. A transitory skin rash resulted in an abscessed appendix in a patient who otherwise had an uneventful convalescence. Crystals and hematuria appeared for two days in the case of an 83-year-old man who was operated on for a ruptured appendix with peritonitis of probably 48 hours' duration. His postoperative recovery was unique in that

† From the Jackson Clinic, Madison, Wisconsin.
* Presented at the Seventh National Assembly of the International College of Surgeons, Denver, Colorado, July, 1942.

there were but a few drops of drainage and the wound healed perfectly.

The question may well be raised as to why we are using sulfathiazole in all of our surgical cases. The end-results are probably the best answer. To date, not a single instance of an infected wound has occurred in a clean surgical case. I will concede that in this era of modern asepsis clean wounds should not become infected, but even under the most careful technic, one occasionally has this misfortune. If by this procedure one can prevent but a single instance or two during the course of a year, it should be worthwhile. When an infection develops following thydroidectomy, for example, the patient may be confined to the hospital not for days, but weeks.

Serum has been relatively uncommon but has not been entirely eliminated. It certainly has not been increased as has been the experience of some writers. My feeling is that the serum is not the result of the sulfonamides so much as it is due to its method of application.

Reports on the use of the sulfonamides at Pearl Harbor by Cloward, Long and Ravdin, and Moorehead emphasized the great value of chemotherapy in preventing wound infection. Most emphasis appeared to be on the efficacy of sulfanilamide, not a great deal being said about the use of sulfathiazole, and a few reports that have come to my attention discussed the use of the sulfonamides within the peritoneal cavity. Thus Cloward reported sulfanilamide was of value not only in scalp and skull wounds but also in the missile tract in the brain. His preference for sulfanilamide was based on the report of Goodwin and Findley. Their experimental studies showed that sulfanilamide was absorbed more rapidly into the blood stream than any other sulfonamide drug. Long and Ravdin reported on the startling efficacy of sulfonamides in open wounds, and Moorehead states that purulent exudate was practically absent from the wounds.

In an effort to crystallize opinion regarding some of the controversial points on the use of the sulfonamides in surgery, a questionnaire was sent recently to twelve leading American and Canadian surgeons, and a summary of their reports was presented at the Southeastern Surgical Congress in Atlanta, Georgia, March 11, 1942. The surgeons in this group were Fred Rankin, Lexington, Kentucky; Verne Hunt, Los Angeles, California; Vernon David and Raymond McNealy, Chicago, Illinois; Mont Reid, Cincinnati, Ohio; Thomas Orr, Kansas City, Missouri; Waltman Walters, Rochester, Minnesota; Henry Cave, New York, New York; Robert Sanders, Memphis, Tennessee; Claude Hunt, Kansas City, Missouri; Gordon Fahrni, Winnipeg, Canada, and Fred Bailey, St. Louis, Missouri.

This group was considered to be a representation of all surgeons outstanding in their localities and of national reputation. McNealy reported that he had not had the occasion to use the sulfa drugs in conjunction with surgery. Walters withheld his opinion on many questions pending a study of a control group.

They were asked the following questions:

1. Are you using any of the drugs of the sulfa group intraperitoneally?

All eleven replied "yes."

2. If so, what drug or drugs and how much?

Of ten who answered, nine stated that they were using sulfanilamide; of these, two were using sulfathiazole also; Claude Hunt of Kansas City preferred sulfathiazole alone (in this respect agreeing with the author).

The dosage varied from 4 to 12 gm. of sulfanilamide, depending upon the type and severity of the case. The aver-

age dose of sulfathiazole used by Claude Hunt, Fahrni, Sanders and myself has been 8 gm. Verne Hunt stated:

"We have closed the abdomen without drainage in many instances where formerly we would have instituted drainage. We have been very favorably impressed with the intraperitoneal use of sulfonamides and have confined our usage of these drugs practically entirely to sulfanilamide.... We have more often used 10 gm. than 5 gm., and at no time have we seen any untoward results from the use of this amount of the drug."

Rankin reported its use of particular value in cases of intestinal resection. Cave, of the Roosevelt Hospital in New York, where the first successful report of the intraperitoneal use of sulfanilamide was reported by Mueller and Thompson, said:

"We prefer sulfanilamide. We have used sulfasuxadine and sulfathiazole, but are going back to sulfanilamide as it does not cake up. We use, as a rule, about 8 to 10 gm., depending upon the amount of infection."

3. What type of cases, if used?

Of nine replies, seven stressed the value of the sulfa drugs in intraperitoneal infections or acute peritonitis, the result of a perforated viscus.

Claude Hunt stated:

"I have used both sulfanilamide and sulfathiazole with excellent results in cases of ruptured appendix, perforated ulcers and in gangrenous gallbladders. In gastric and colon resection, sulfathiazole is sprinkled along the suture line as a prophylaxis against possible infection. Sulfathiazole appears to give good or better results with fewer complications."

Cave used the sulfonamides in acute diffuse peritonitis and local abscesses following acute suppurative appendicitis, also in any kind of intra-abdominal intestinal resection and around perforated gallbladders, following hysterectomy, before peritonealization of the stump of the cervix, etc.

4. Has it lowered mortality?

Of ten replies, seven answered "yes." Bailey said "probably;" Orr was not certain; Walters wanted further study before replying.

5. Has it decreased complications?

All felt that it had.

6. Has it affected drainage?

The following replied "yes:" Sanders, Claude Hunt, Verne Hunt, Rankin, Fahrni, Reid and Bailey. David and Orr were not certain it had affected drainage. Cave probably misunderstood the question.

7. Are you using it in wounds?

The following replied "yes:" Sanders, Claude Hunt, David, Fahrni, Reid, Orr and Bailey. Walters and Verne Hunt replied "occasionally," and Rankin said "no." Cave said: "We are using it only where there might be a potential infection, as in a very fat anterior abdominal wall or in infected tendon sheaths and in potential bone infections."

8. Are you using it in clean cases as a prophylaxis against infection?

All stated they were not using it routinely in clean wounds.

In a previous paper dealing with the intraperitoneal use of sulfathiazole, I stated that this drug had been used in every patient operated on by the writer since April, 1941, either in the incisions, intraperitoneally, intravenously or by mouth. The object of using sulfathiazole in 100 per cent of the operations was to ascertain as soon as possible whether the brilliant results obtained early in our experience might be continued in a larger series of cases. In this study it was shown that in 161 major operations performed on clean cases no infections occurred. This procedure gives rise to a point for discussion. It has been stated

by Ochsner, Coller, Bick, Mueller, Cave and others that the sulfa drugs, particularly sulfathiazole, interfered with wound healing. That has not been the experience on my service at the clinic where we have even noted an improvement in thyroidectomy scars and little or no serum in abdominal wounds. My brother, James, advises me that there has been a noteworthy improvement in his cases of abdominal perineal resection. The answer to this apparent discrepancy in reports is probably due to the method of application and possibly to the type of drug.

When we were using sulfanilamide in 1939 and 1940, we were scattering it in the wounds with a tongue depressor or by means of a test tube. At that time two cases of postoperative wound hematoma occurred, which I felt were due to sulfanilamide. These were reported at the sectional meeting of the American College of Surgeons held in St. Paul, Minnesota, in March, 1941. Immediately following that meeting, sulfathiazole was substituted for sulfanilamide in all cases because it gave results that seemed as good or better, with fewer complications. At the same time the powder was either dusted lightly into the wounds by means of a salt shaker or put in by an insufflator. We rarely used over 1 or 2 gm. The general improvement in the wounds has been such that a considerable saving in gauze and adhesive tape has been affected which is an important wartime economy. Clean wounds are seldom disturbed now until time to remove the stitches and the curtailment of drainage in infected wounds has been remarkable. The cause of caking and foreign body reaction in the wounds may be due to the manner of application, and further reports along this line will be watched with interest.

The question of the danger of using sulfanilamide and sulfathiazole intraperitoneally, as reported by Spink, Ochsner and others, needs further clarification. Cave, in his reply to my questionnaire, kindly forwarded a summary prepared by James E. Thompson of the most recent statistical study available of the cases treated at Roosevelt Hospital by the intraperitoneal use of sulfonamides. As I understand, sulfanilamide was the drug used in the majority of these cases. This report shows that the drug has been used in 125 cases of acute appendicitis, and in 200 other cases it has been used prophylactically in other types of abdominal surgery. I believe I am correct in stating that no serious complications have been observed by the Roosevelt group. Yet others, notably Spink, have reported the possibility of serious liver damage resulting particularly from the use of sulfanilamide intraperitoneally, and Ochsner has warned of the danger of optic atrophy from sulfathiazole.

In a small series of 23 cases of perforated viscus, with varying degrees of peritonitis and abscess formation which I reported elsewhere, no deaths and no serious complications resulted from the use of an average dose of 8 gm. of sulfathiazole intraperitoneally. There is a dearth of clinical reports in the literature on the intraperitoneal use of the sulfonamides. Further studies, both as to their efficacy and possible harmful effects, must be made before the final answer can be given. Up to the present time at the clinic we have used sulfathiazole in 1, 2, or 3 gm. prophylactically within the peritoneal cavity in approximately 300 cases, with no untoward results. The most recent case in which I used the drug was in a cesarean section; 3 gm. were placed in the body of a possible contaminated uterus. A perfectly normal convalescence followed.

One final point calls for further clarification and that is the question as to

whether or not drainage is on the way out. Considerable time may elapse before the answer to this question is solved. At the Atlanta meeting a surgeon came to me and stated that he was closing all his cases without drainage after using sulfonamides. When asked if he meant 100 per cent of his cases were closed without drainage, he hesitated and replied "nearly all." In view of the paucity of data published on the intraperitoneal use of sulfonamides, it seems rather dangerous to assume from a few spectacular results that all drainage may be abandoned, especially so in cases of abscess. Rather, we should continue to be guided by well accepted principles until sufficient statistical reports by experienced surgeons give assurance that drainage may be curtailed and possibly eliminated in certain types of intraperitoneal infections. In the series of 23 cases discussed previously, some were closed without drainage and in others the type of drain was curtailed in size. From this study I feel that the cigarette drains can be eliminated and that small, soft rubber tubes and penrose rubber tissue will suffice. The amount of purulent discharge was reduced to a minimum, suggesting that several patients could have been closed without any drains. In those patients closed without drainage the convalescence was uneventful and they were out of bed as early as in the nonsuppurative cases.

Finally, there remains the interesting question as to what effect the sulfonamides will have on postoperative intraperitoneal adhesions. Will adhesions be increased or decreased? What little information I have at present suggests that adhesions will be decreased.

SUMMARY

A series of 370 major, and 128 minor, surgical operations is reported in which sulfathiazole was used either in the incision, within the peritoneal cavity or administered by mouth or intravenously. In no instance in which the drug was used prophylactically in a clean case did infection occur in the wound. One or two grams were lightly dusted into the various layers or a salt shaker or insufflator was used. The sulfathiazole was not sterilized but used as prepared commercially in the powder form and in sterile containers.

Sulfathiazole was used in 1, 2 or 3 gm. amounts prophylactically within the peritoneal cavity in approximately 300 cases of cholecystectomies, appendectomies, hysterectomies, etc., with no untoward results. It was used likewise in all operations performed upon the gastro-intestinal tract in which possible contamination might occur, and in cesarean sections. It was used in 21 cases of perforated appendices with abscess formation and localized or generalized peritonitis. All patients recovered with remarkably smooth convalescences. Wound drainage and infection were virtually eliminated. Four of these cases were closed without drainage. In the others, the number and caliber of the drainage tubes were reduced. Cases of perforated ulcers, perforated gallbladders, acute salpingitis and perforation of the large bowel due to carcinoma were all closed without drainage.

Two fatalities occurred in the 370 major surgical cases. Death from peritonitis resulted in a patient with a perforated duodenal ulcer of 48 hours' duration that was closed without drainage. Pulmonary embolism caused the death of a 72-year-old man with acute intestinal obstruction due to a large gallstone in the jejunum on the fourteenth postoperative day.

The problem of drainage needs further study and investigation. There is every indication at present that drainage

will be considerably curtailed by the use of the sulfonamides. Until the subject is further clarified, one should not abandon well accepted procedures.

In this series of 370 cases only two complications were observed — a mild skin rash and a transitory hematuria. The literature, however, contains numerous reports of sequelæ developing following the use of sulfonamides by mouth in rather large doses in both medical and surgical conditions, as well as when the drug is used a second time after a free interval. The use of sulfathiazole, as reported in this study, by an initial dose in the wound or within the peritoneal cavity appears to be attended with little danger. A further study of its daily postoperative use by mouth or intravenously is being conducted.

By decreasing and eliminating the need for drainage, by preventing and successfully combating wound infection, postoperative cystitis and other sequelæ, sulfathiazole has shortened convalescence and permitted patients to be up sooner. In turn, it has decreased the incidence of thrombophlebitis and embolism.

A summary of a questionnaire recently sent to twelve leading American and Canadian surgeons regarding some controversial points on the use of the sulfonamides in surgery is presented.

The average dose of sulfathiazole used intraperitoneally was 8 gm. It was used in the powder form or with sterile saline solution as a vehicle. Chemotherapy will never replace good surgery, but it has already proved to be an adjunct par excellence.

BIBLIOGRAPHY

1. Barnstein N.: Staphylococcus Aureus Septicemia—Chemotherapy, Jackson Clin. Bull., 2:40-41, 1940
2. Cloward, R. B.: War Injuries to the Head. J.A.M.A., 118:267-270 (Jan. 24), 1942
3. Goodwin, L. G., and Findley, J.: Absorption and Excretion of Sulfonamides Applied Locally: Observations in Rabbits. Lancet, 1:691-692 (May 31), 1941
4. Mueller, R. S.: Use of Powdered Crystalline Sulfanilamide in Surgery. J.A.M.A., 116:329 (Jan. 25), 1941
5. Mueller, R. S.: Use of Sulfanilamide Locally in the Treatment of Peritoneal Infections. Jackson Clin. Bull., 3:66-71, 1941
6. Spink, W. W.: Communication. Jackson Clin. Bull., 3:66-71, 1941
7. Jackson, A. S.: Editor's Comments. Jackson Clin. Bull., 3:66-71, 1941
8. Jackson, A. S.: Use of Sulfathiazole Intraperitoneally. Jackson Clin. Bull., 4:24-28, 1942
9. Jackson, H. C., and Coller, F. A.: Use of Sulfanilamide in the Peritoneum. J.A.M.A., 118:194-199 (Jan. 17), 1942
10. Long P., and Ravdin, I. S.: Report to the Surgeon General of the Army on the Pearl Harbor Attack. J.A.M.A., 118:465 (Feb. 7), 1942
11. Key, J. A., and Burford, T. A.: Prophylactic Implantation of Sulfanilamide in Clean Operative Wounds for the Reduction of Postoperative Infections. Surg., Gynec. & Obst., 73:324-332 (Sept.), 1941
12. Harbison, S. P., and Key, J. A.: Local Implantation of Sulfanilamide and Its Derivatives in Wounds. Arch. Surg., 44:22-26 (Jan.), 1942
13. Bick, E. M.: Observations on the Topical Use of Sulfonamide Derivatives. J.A.M.A., 118:511-512 (Feb. 14), 1942
14. Hunt, V. C.: Personal communication to the author
15. Bailey, F. W.: Personal communication to the author
16. Moorhead, J. J.: Surgical Experience at Pearl Harbor. J.A.M.A., 118:712-714 (Feb. 28), 1942

SUMARIO

Se describe uña serie de operaciones, 370 mayores y 128 menores, en las cuales se usó sulfatiazol, ya sea en la incision, en la cavidad perintoneal, o bien administrado por la boca o por inyeccion intravenosa. En ninguno de los casos asepticos en que esta droga se usó de una manera profilactica sobrereino infeccion en la herida. En cerca de 300 casos de colecistectomia, apendectomia, histerectomia, etc. se usó el sulfatiazol en la cavidad peritoneal, sin ningúna mala consecuencia. El uso del sulfatiazol, tal como se describe en este trabajo por una dosis inicial en la herida o en la cavidad peritoneal, no parece presentar ninguin peligro.

RÉSUMÉ

L'auteur rapporte une série de 370 grandes et 128 petites opérations chirurgicales dans les quelles on employa le sulfathiazole ou dans l'incision, ou dans la cavité peritonéale ou par voie orále ou intraveineuse. Incun cas noninfecte, dans l'equal cette drogue fut employée ne developpa de l'infection dans la plaie. On employa le sulfathiazole dans la cavite péritonéale dans à peu

près 300 cas de cholecystectomies, d'appendicectomies, d'hystérectomies, etc. sans résultats désagréables. L'emploi du sulfathiazole comme dose initiale dans les plaies ou dans la cavite peritonéale paraît être accompagné par peu de danger.

Выводы

В серии 370 крупных операций и в серии 128 мелких операций сульфатаязол употреблялся или в разрезе, в брюшной полости, или-же пероралвно, или через вену. Там где сульфамаяазол был употреблен профилактически, не намечено было инфекции. Сулфамазол был употреблен в 300 случаях холецастекомий, аппендектомий, гистеректомий и т. п., без никаких нибудь осложений. Как видно, можно употреблять сульфатаязол или в разрезе или в брюшной полости без опасности.

ANNOUNCING THE FOURTH INTERNATIONAL ASSEMBLY OF THE INTERNATIONAL COLLEGE OF SURGEONS TO BE HELD AT THE WALDORF-ASTORIA HOTEL, NEW YORK CITY, JUNE 14 to 16, 1943.

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Castless Ambulatory Method of Treating Fractures*

ROGER ANDERSON, M.D., F.A.C.S., F.I.C.S.
SEATTLE, WASHINGTON

PROGRESS in fracture therapy, as in any field of science, is based on change in the current concepts of treatment. Castless ambulation for all types of shaft fractures would, at first thought, seem to be wishful thinking, but when certain principles are employed it becomes a reality of practical importance not only for war surgery but equally so for civilian practice.

The operating principles of this castless procedure are (1) to control the fracture by angularly inserting two transfixions into each fragment, and (2) to supply immobilization by connecting the two sets of transfixions with a slender rod. Anatomic studies have demonstrated that there is a safe door for transfixing both fragments of any one of the long bones. Furthermore, transfixation can be carried out without incision of the skin or preliminary drilling of the bone.

This method is applicable to any fracture of the long bones in any extremity, whether transverse, comminuted, or compound, and is effective even when the fracture extends into one of the distal joints. It is an ideal supplement to many orthopedic procedures, such as arthrodesis of the knee, non-union or mal-union operations, and length equalization and reconstruction operations. So comprehensive is its scope that the treatment of fractures of the long bones can at last be said to be standardized. Furthermore, standardization and simplification have been extended to the transfixation units themselves. For instance, the same unit can be used for the femur or humerus in the largest man or the smallest woman. The units have been so devised that they hold half-pins, through-and-through pins, or wires. An external safety stop makes possible the use of thinner pins than previously employed. As these fracture units can be used for all fractures of either extremity, and will hold any type of transfixion, they are referred to as *universal* fracture units.

The units and fixation rods, as illustrated below, are constructed of a rust-

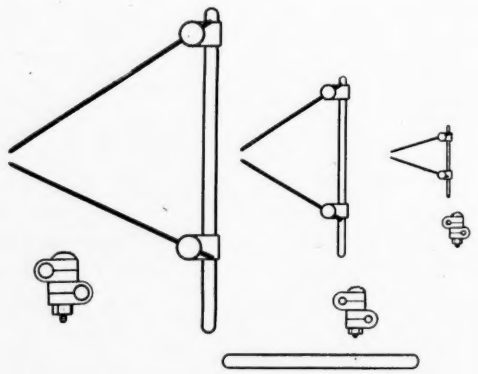

Fig. 1. Three sizes of *universal* fracture units. *Large size,* used chiefly for femur, tibia and humerus, and in the forearm of muscular men. The fixation rod is illustrated below and to the right is the fixation rod clamp. *Medium size,* used chiefly for fractures of the forearm and for Colles' fractures. *Small size,* used for metacarpal, metatarsal, phalanx, clavicle and mandible.

*Presented at the Seventh Assembly of the International College of Surgeons, Denver, Colorado, July, 1942.

less alloy, so light that the whole apparatus for immobilization of a fractured shaft of the femur weighs only twelve ounces.

TECHNIC

The skin area for transfixation is cleansed with soap and water, ether and, if desired, a weak solution of iodine. No preliminary cutting or pulling of the skin is necessary before inserting the pins. Two half-pins are angularly placed into each fragment. Small, dry dressings are spiked over the pins, a pin clamp is slipped over each half-pin, and then a

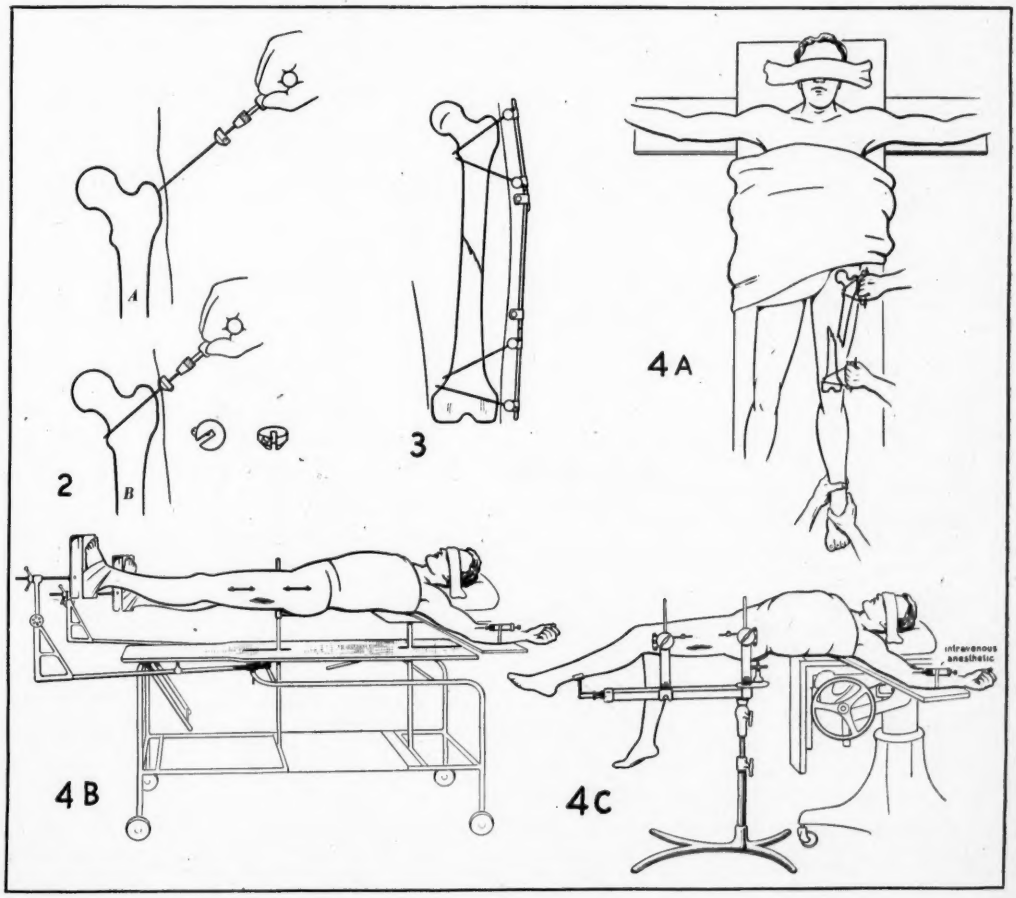

Fig. 2. Earl safety stop which prevents plunging through or over-insertion of the half-pin. When the point of the pin contacts the shaft the stop is fastened to the half-pin at a point the same distance from the skin as the distance the pin travels through the bone. This latter distance is estimated from the radiogram or clinical experience.

Fig. 3. Immobilization of femoral shaft fracture utilizing fracture units in the form of half-pins.

Fig. 4. Photograph illustrating three ways force may be supplied for reduction. (A) Manual reduction. (B) Fracture table reduction. (C) Anatomic splint reduction.

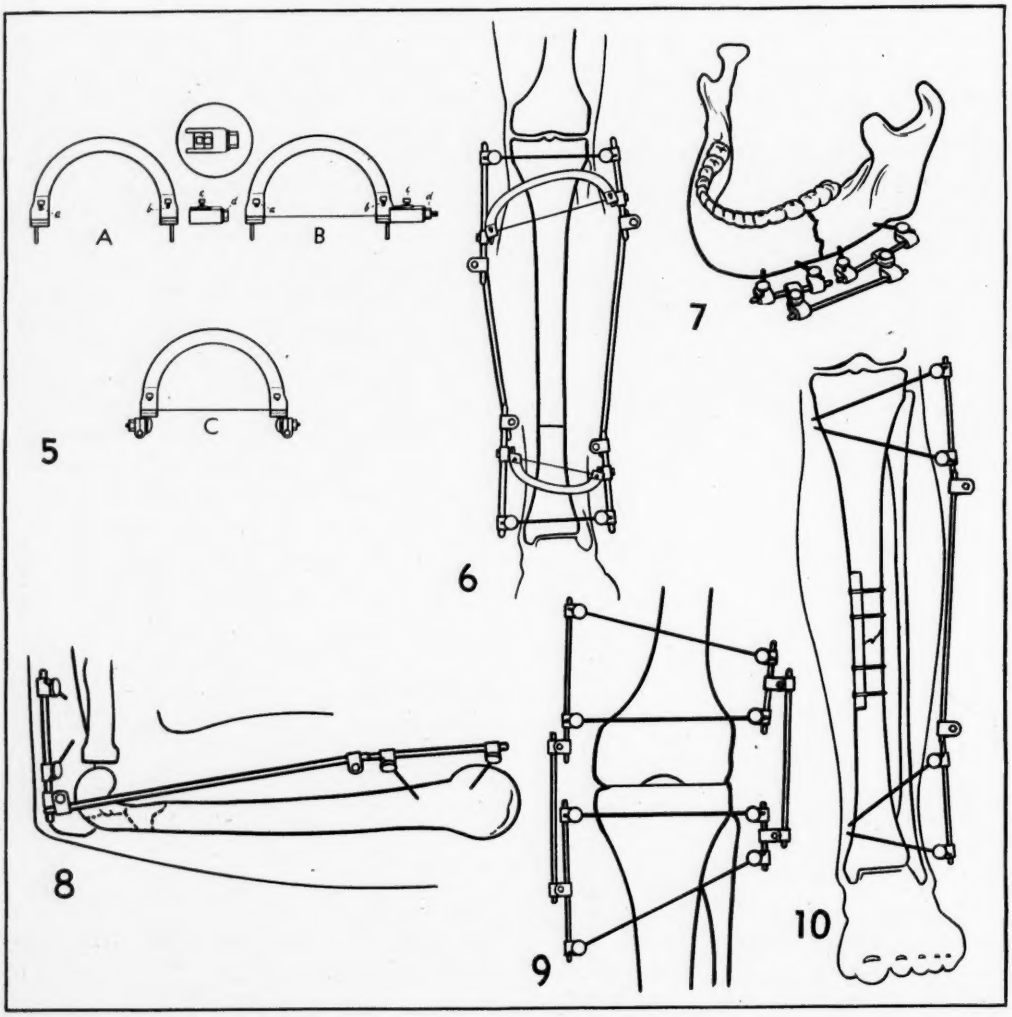

Fig. 5. Wire tautnor constructed of alloy weighing only five ounces. The detachable wire tightener fits into the different sized tautnors. The stud pins on the tautnors are fastened into the clamps on the fracture units.

Fig. 6. Through-and-through Steinmann pin and Kirschner wire inserted angularly into each fragment and the fracture immobilized with fixation rod on each side. Four pins or four wires may be used equally well, but for transfixing the shaft it is best to use a wire or slender pin. Through-and-through transfixation is also feasible through the distal femur, superior ulna, os calcis, certain metacarpals, ilium and ligamentum nuchæ.

Fig. 7. Fractures of the mandible may be reduced by the Converse-Waknitz technic, employing the small fracture units.

Fig. 8. Fractures into the elbow, wrist, knee or ankle joint may be treated without change in technic.

Fig. 9. The fracture units lend themselves admirably as adjuvants to orthopedic procedures such as arthrodesing, reconstruction, or plasty operations, and by substituting threaded rods for the fixation rod, lengthening or shortening procedures may be accurately controlled.

Fig. 10. Universal units and rods can be employed also as supplementary immobilization following open reduction with bone grafting, wiring, or plating.

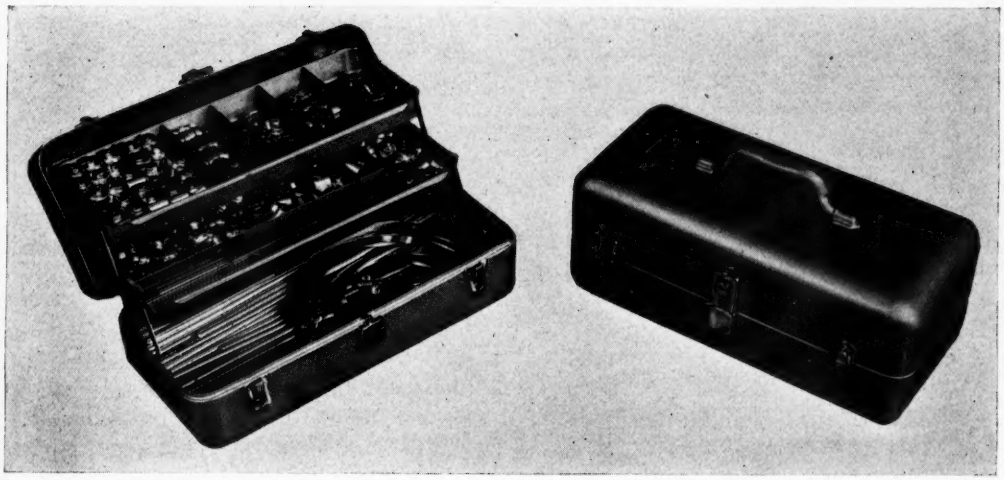

Fig. 11. The fracture technic has been so standardized and the fracture units are so compact and light that enough fracture units, clamps, fixation rods and tautnors can be held in this small kit to reduce and immobilize twenty-five shaft fractures of any type or location. The kit when filled weighs less than twenty pounds, and as both the case and units are rustless, the filled case can be sterilized by boiling in a pan of water.

universal rod is securely fastened into the pin clamps.

Reduction by direct control of the fragments is accomplished by manipulating the fracture units by one of three means: (1) manual; (2) fracture table, or (3) anatomic splint. We prefer the latter because each fragment can be directly and individually controlled by mechanical movements, operating upon the exact anatomic center; furthermore, both fragments are held rigid during the radiographic check-up. Through-and-through transfixation, where practicable, as in the distal femur, employs the same fracture units and operates upon the same principles. Kirschner wire can also be used without any change in technic, and the operator may insert one, two, three or four wires, according to his judgment.

Immobilization is quickly obtained by fastening the fixation rod to the two fracture units by the fixation rod clamps.

Compound fractures can be effectively treated, as reduction is positively immobilized by the rod so that thereafter all attention may be directed toward treatment of the soft tissue wounds by any method of choice. If Orr's method is selected, the obnoxious odor may be minimized as the plaster may be changed as often as is indicated without danger of losing apposition. A complicating gas infection can be readily approached for radiotherapy. Rod fixation also provides access for later sequestrotomy, skin grafting, and removal of foreign bodies.

As we all recognize, *callus* can be derived only from the blood stream. Thus it is evident that any improvement in circulation will naturally hasten the formation of callus. Ambulation with muscle contraction and contiguous joint movements cause an increased circulation of blood and lymph. This sovereign advantage has not been emphasized in the past, possibly because it was unobtainable.

The words "castless" and "ambulatory" vividly portray the advantages of this method, and the physiologic and economic benefits are so numerous and evident that they need no further elucidation.

SUMMARY

A technic for a castless, ambulatory method of treating fractures of the long bones has been outlined.

SUMARIO

El tratamiento ambulatorio de todas las fracturas de las diafisis oseas se puede llevar a cabo, sin tener que practicar el enyesamiento, utilizando ciertos aparatos que consisten de tallos delgados conectados a ciertas unidades de transfixacion. Estas unidades han sido ideadas de tal manera que puedan asegurarse al tipo de alfiler o alambre de traccion que se quiera usar en un dado caso. Los tallos de fijacion son faciles de aplicar, aseguran la inmovilizacion rigurosa de los fragmentos, y pueden re-adjustarse con facilidad en los casos que se quiera cambiar la posicion de los fragmentos.

La reduccion de la fractura se hace de acuerdo con una tecnica semejante a la que el autor advoco anteriormente, como sigue: Dos alfileres de transfixion son introducidos directamente y en direccion angular en la substancia de cada fragmento; lo que se ejecuta sin tener que hacer antes una perforacion del hueso o una insicion previa de la piel. El tipo de la fractura y su localizacion determinan la clase de alfiler que se debe de usar. Los dos alfileres de transfixion introducidos en cada fragmento, cuando son conectados con su correspondiente tallo, constituyen lo que se llama una unidad de transfixion. Con la manipulacion correcta de estas dos unidades de transfixion se puede obtener la reduccion satisfactoria de la fractura. La inmovilizacion se asegura conectando las dos unidades de transfixion con uno o dos tallos de fijacion.

RÉSUMÉ

Le traitement ambulatoire de toutes les fractures des os longs peut être effectué de nos jours à l'aidè de tringles qui agissent en unissant de un agents de transfixion. Les èléments de ces tringles sont construités de facon à immobiliser des demi-épingles des épingles entières ou des fils de fer. Pour le traitement des fractures des os longs et, aussi, comme supplément de procédes orthopédiques les moyens de transfixion sont nombreux. Les tringles fixatrices s'attachent facilement, obtiennent une immobilisation sûre peuvent être facilement ajustées et permettent quand il y a lieu, changement de position des fragments de l'os fracture d'être réadjustees.

La technique de réduction est semblable à celle prèconcisée par l'auteur pour transfixion des fragments sans incision de la peau et sans perforation preliminaire de l'os on peut selon les indications employer des épingles des demi-épingles ou des fils de fer de Kirschner. Les deux transfixions fixées a la tringle constituent l'unite usant deux unites comme manche controleur, on reduit la fracture et on obtient l'immobilisation en fixant les deux unités au deux tringles fixatrices.

Выводы

Описывается амбулаторное лечение переломов цилиндровых костей, без гипсовой повязки, с помощью тонких соединительных стерженей соединяющих отдельные части фиксирующего аппарата. Эти части (единицы) устроены так, чтобы содержать полу-болт, или-же болт (гвоздь), который проходит через всю толщину, или же проволоку. Это делает

возможным выбор какойбы то ни было фиксации переломов длинных костей. Стержени накладываются легко, дают хорошую иммобилизацию и могут прилаживаться по нужде когда нужно изменить направление обламков.

Редукция производится так что две трансфикции проводятся углообразно в каждый осколок без нареза кожи.

Употребляются полу-болты, болты, или проволока Киршнера. Две трансфикции, привиктованные к стерженю, составляют одны единицу. Редукция обломков делается употребляя эти две единицы как ручки. Оконечность иммобилизируется посредством соединения двух частей одним или двумя соединительными стерженями.

THE McCARTHY ENDOWMENT OF THE NEBRASKA POST-GRADUATE STUDY GUILD OF THE INTERNATIONAL COLLEGE OF SURGEONS TO THE CREIGHTON UNIVERSITY SCHOOL OF MEDICINE

This endowment was created by Dr. T. F. McCarthy and first announced at the Third International Assembly of the International College of Surgeons held in Mexico City in August, 1941. It provides post-graduate instruction in all of the basic subjects of surgery, surgical anatomy, gross and microscopic pathology, animal surgery, etc., without charge to any of the Affiliates of the International College of Surgeons or members of the Nebraska Guild.

A number of the Affiliates of the College have taken advantage of this privilege and are carrying on research in the anatomic and pathologic laboratories of the University of Nebraska.

The Object and the Value of the Pre-operative and Post-operative X-Ray Treatment in Carcinoma of the Breast

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ACCORDING to United States Vital Statistics, in 1920, there were 6,665 deaths from cancer of the breast, which had increased in 1929 to 10,204 deaths (53 per cent), and in 1939 to 14,868 deaths (123 per cent). During these 20 years, there was, of course, an increase in the total population and a progressive increase in the relative old age, but these figures indicate the seriousness of this problem. Since the average length of life before death from carcinoma of the breast is from three and one-half to four years, and since probably 20 per cent of all cases are permanently cured, we have a right to assume that approximately 50,000 women in the United States have cancer of the breast at the present time.

Much progress has been made in the treatment of carcinoma of the breast if one compares the present-day results with those obtained 50 years ago. At that time the operative mortality as reported from the Billroth Clinic was 23 per cent, and the three-year recoveries were only 4.3 per cent, while today, the operative mortality varies from less than 1 per cent to 5 per cent, and the five-year recoveries vary from 70 per cent in Stage I* to 23 per cent in Stage II (no longer encapsulated within the breast), and almost no recoveries in clinical Stage III.

A very great advance was made, however, in the treatment of carcinoma of the breast in the last 50 years. This advance is due to the operation described by Halstead in 1894. However, in the last 40 years, the operative results in carcinoma of the breast have not been appreciably improved (Hutchison, and Lewis and Rienhoff).

The failures from surgery occur in those cases which have passed beyond Stage I, and occur in those in which the disease has become attached to the skin or has extended to the axillary lymph nodes (Stage II); and in Stage III, which includes those cases in which the disease has extended beyond the axilla, or in which the tumor tissue is fixed to the chest wall or the axillary tissues, or in which the cancer has invaded the skin, or in which the breast is edematous; and Stage IV, which includes those that have distant metastases.

Since 70 per cent of the cancers of the breast are cured if operated upon while the disease is strictly confined to the breast, our aim must be to see that all operations are performed while the disease is still in Stage I (small tumors strictly confined to the mammary gland). Unfortunately, only 10 per cent of the patients come to the surgeons in this early stage. To accomplish the best results by treating patients in this Stage I, the laity must be educated as to the dangers of lumps, lancinating pains and bloody discharge from the nipple. Like-

*The terms clinical "Stages" I, II, III and IV, are used to distinguish them from the microscopic malignant Grades 1, 2, 3 and 4.

wise, the physicians must become more alert and more skilled in early diagnosis. The early diagnosis of cancer of the breast, however, is often difficult, and even in the case of those most skilled, there is a considerable percentage of doubtful cases. The difficulty in making an early diagnosis is well illustrated by a report from MacCarty. He has studied the records of 2,100 cases at the Mayo Clinic, in which a doubtful diagnosis was made in 21.5 per cent, and of these doubtful cases, the diagnosis was incorrect in 37.2 per cent. If such difficulties arise in a large clinic with highly trained men, the problem must be much greater for the general practitioner who sees only a few cases in a year. When in doubt, immediate consultation with an expert is advisable. In this connection, it must be remembered, however, that rough and repeated examinations of the breast are dangerous (Holman).

I believe that the best results in the management of cancer of the breast will be obtained in all cases if there is a consultation among the family physician, the surgeon and the radiologist. Fortunately, the radiologist can be of some technical assistance in the diagnostic problem by making a roentgenographic examination of the breast and the chest and the skeleton. At times, distant metastases are found in a supposedly early lesion. Finally, a wide excision of the tumor or a mastectomy for miscroscopic diagnosis may be the most conservative treatment of a doubtful case. Dawson and Tod, after examination of a large amount of material say: "In women over thirty-five years, simple mastectomy with immediate examination of the gross pathology of the breast and submission of the tissue for histologic opinion is the method of choice."

RECOMMENDATIONS IN TREATMENT

Stage I.—In the treatment of cancer of the breast in Stage I, we should recommend operation at once, and at present we can properly limit the treatment to operation. Pre-operative irradiation will do no harm in these early cases, but it has not been proved of marked value. The records show that if a patient is operated upon while the tumor in the breast is freely movable, and the disease is confined strictly to the breast, 70 per cent or more recover. We must always remember that it is possible that a very small tumor in the breast may be associated with distant metastases at the time of the first examination or the original operation. Such metastasis accounts for the surgical failures in Stage I, when the recurrence is not local. When such distant metastasis is found, the case must, of course, be classed in Stage IV. In 29 per cent of the cases studied by Harrington, in which lymph nodes were not palpable and were supposed to be in Stage I, metastases were found at operation. When axillary metastases are found at operation, the case must be classified in Stage II, and post-operative irradiation should be given, even if no pre-operative irradiation has been used. Unfortunately, probably less than 10 per cent of all breast cancers come to the surgeon in this early stage (I), and only 20 per cent of the *operable* cases (Harrington) are still in Stage I.

Stage II.—Cancer of the breast in Stage II should be treated by *pre-operative irradiation, surgery,* and *post-operative irradiation.* However, no combination of treatment can compensate fully for delay in diagnosis or operation, while the disease is still in Stage I. Of 2,396 operable cases (Stages I and II) coming to the Mayo Clinic (Harrington), 80.6 per cent were in Stage II. Judged by general surgical statistics from large clinics, as reported in the literature, only 23 per cent of this group can be expected to be alive after five years, but if irradiation is added to operation, approxi-

mately double the number should be alive after five years.

THEORETICAL AND BIOLOGIC EVIDENCE FAVORING PRE-OPERATIVE IRRADIATION

Pre-operative irradiation tends to devitalize or destroy the more malignant types of cells. According to the microscopic studies of carcinoma of the breast, four characteristic grades of malignancy have been recognized, and as a result the tumors have been divided into Grades 1, 2, 3, and 4 (Broders, MacCarty, Harrington, Ewing, Dawson, and Tod). Of these, Grade 1 represents the least malignant. Dawson and Tod state that these microscopic grades of malignancy can be determined only after complete operation and a study of the entire breast. While there is a general microscopic appearance in these tumors which permits classification and is helpful in determining the prognosis, as has been well shown by Harrington, some characteristics of all these grades are apt to be found in some part of each tumor. To make this point clear, I made inquiry of a number of our leading tumor pathologists, namely, James Ewing, Joseph McFarland, W. C. MacCarty, Stanley Reimann, and Eugene Case.

MacCarty writes: "In answer to your questions relative to different grades in different portions of a tumor: (1) Different portions and even different areas in the same microscopic field show different grades. (2) The grades of the primary and secondary tumors vary. (3) Recurrent tumors are often different in grade from the primary tumor. (4) Grades differ considerably, depending on who does the grading. (5) Different grades have different criteria. Personally, I know that the grading of tumors has only probability value when used clinically."

Ewing says: "One can sometimes find different portions of cancers, but this is the exception and not the rule. Generally, the tumor is uniform, but the peripheral areas are better nourished and more alive, and these are the ones we must sterilize by radiation or remove by surgery."

McFarland says: "I think that there is truth in the principle upon which grading is based, but error enough in the practice to neutralize much of the usefulness. If one takes a large enough section of a cancer he can usually find microscopic fields representative of all four grades of disease. Suppose the section is small enough to show only one of them; then he would suppose the others absent, and be wrong. But those who practice grading assert that in the long run it is helpful, and they may be right. My own experience has not been satisfactory."

Case says: "One commonly finds undifferentiated cells in tumors of a less degree of malignancy if a sufficient study of the tumor is made. They may be few in number, but when present they certainly affect the grading of an otherwise slowly growing tumor."

Reimann says: "I hold the opinion that various grades of malignancy can be found in at least half of the tumors encountered in a service such as we have at our hospital, and probably in 75 per cent if a sufficient number of sections are taken from different areas."

In his studies of 2,396 operable cases (clinical operable Stages I and II), Harrington (Table I) has shown that the microscopic grade of malignancy has much to do with the prognosis following operation for carcinoma of the breast. In his study, he found as high as 100 per cent five-year survivals in microscopic Grade 1, and as low as 17 per cent in Grade 4. It so happens that the microscopic Grades 1 and 2, are more responsive to operation and are the more resistant to irradiation. On the other hand,

TABLE I.—FIVE-YEAR RESULTS, RELATIONSHIP BETWEEN INVOLVEMENT OF AXILLARY NODES AND GRADE OF MALIGNANCY (HARRINGTON, 1935)

TREATMENT	GRADE OF MALIGNANCY	WITH INVOLVEMENT OF AXILLARY NODES (STAGE II)			
		PATIENTS OPERATED UPON		LIVED FIVE OR MORE YEARS AFTER OPERATION	
		TOTAL	TRACED NO.	PATIENTS	TRACED %
SURGERY ONLY					
44 Cases, or 9%	1	4	4	4	100.0
	2	40	38	22	57.9
500 Cases, or 91%	3	174	165	45	27.3
	4	326 = 500	316 = 481	54 = 99	17.1
SURGERY PLUS X-RAYS					
129 Cases, or 10%	1	8	8	8	100.0
	2	121	107	49	45.8
1,234 Cases, or 90%	3	456	424	135	31.8
	4	778 = 1234	732 = 1156	160 = 295	21.9

Remarks: The surgery in the above group was done in one of the greatest clinics in the world. The *post-operative irradiation* was done at scattered points throughout the country. Even under these circumstances, the cases treated by operation and irradiation show over 25 per cent improvement in Grades 3 and 4 (25.5 per cent), as compared with operation alone (20 per cent). These statistics involve 2,396 operated cases; 1,907 of these, or 79.6 per cent, had lymphatic involvement, and 48.4, or 20.4 per cent of the 2,396 operated cases, had no axillary nodes.

Grades 3 and 4, which make up the great bulk of cases and of surgical failures, are the more responsive to irradiation so far as the sensitivity of the cells is concerned. Unfortunately, these microscopic Grades 3 and 4, because of their virulent growth, also give rise more frequently to distant metastases accounting in great part for failures. It is quite logical, therefore, that the combination of irradiation and operation should give better results than either measure used alone, because most, if not all, tumors contain some of the different grades of malignant characteristics (Table I).

It is true that Harrington's statistics do not indicate the expected great improvement in the results from combined treatment (with irradiation and operation), as compared with operation alone, and as is shown by other statistics, but it must be remembered that the surgery in his cases was done in one of the best surgical clinics in the world, but no preoperative irradiation is recorded, and the post-operative irradiation, for the most part, was given at scattered points throughout the country. Even under these circumstances, the cases treated by operation and irradiation show over 25 per cent improvement in Grades 3 and 4, as compared with operation alone (20 per cent). Our post-operative irradiation failures usually result from distant metastases in parts of the body where we have not irradiated. Therefore, the earlier the irradiation can be applied before the disease has spread beyond the field of irradiation, the better will be the results.

Our greatest concern, therefore, both from the surgical and radiation standpoint, is connected with microscopic Grades 3 and 4 in the clinical Stage II. These represent 91 per cent of the 1,907 operable cases in which there was glandular involvement (Harrington), and of these two more malignant grades, only 20.5 per cent of the 481 traced patients who had operation only, were living five years after operation. It must be clear, therefore, that our greatest problem is in dealing with the microscopic Grades 3 and 4, in the clinical Stage II. This group

represents approximately 80 per cent of all operable cases. Even the cases classified as Grades 1 and 2 are likely to contain some of the more malignant cells. For this reason, when axillary nodes are present (Stage II), all cases should have added to surgery both pre-operative and post-operative irradiation.

It so happens that as far as the microscopic disease is concerned, Grades 3 and 4 are the most radiosensitive, while Grades 1 and 2 are the least radiosensitive. This, too, is a matter of common knowledge and common agreement. Unfortunately, these same Grades 3 and 4 represent the type of disease which leads to early and extensive metastases. This is also shown by Harrington's studies in which 90 per cent of operable cases with lymph node involvement belong to Grades 3 and 4. It is also self-evident that unless the irradiation is applied while the disease is still in the area usually treated, ultimate failure will result. Again I must say, "the earlier the patients are irradiated, the better will be the results."

Probably no one has studied the pathology and the clinical behavior of carcinoma of the breast more than the late surgeon, Joseph C. Bloodgood. He said, in 1935: "There is no danger whatever in giving pre-operative irradiation to clinical operable breast cancers. There is no danger in delaying the complete operation from two to three months if devoted to a thorough course of irradiation. I have some cases now in which, although the cancer cell is still to be stained in the microscopic sections, there is no growth, and in most of these early cases there is no evidence of metastasis. There was no growth in the tissue culture. There is an increasing number of operators, radiotherapeutists and pathologists who are beginning to feel that the moment pre-operative irradiation begins the danger of delay is averted; that is, that there is ample time to give as much irradiation as may be necessary. If there is no internal metastasis, there is no danger of its taking place or of further involvement of the axillary glands after properly performed pre-operative irradiation."

Based upon the fact that the more malignant type of cells (Grades 3 and 4) is rendered less malignant by even a moderate amount of irradiation (much less than is needed for complete destruction), it is fair to assume that such irradiation given to a patient with carcinoma of the breast will partially devitalize the more malignant type of cells, which is the cause of extensions and of the surgeons' failures. This should decrease the recurrences due to implantation during operation and should render less likely the dangerous lodgment of emboli which have been carried through either the lymph stream or blood stream, as a result of the manipulations concerned with the operative procedures. Such devitalizing effect upon the more malignant cancer cells surely occurs immediately after the treatment, even though it cannot be demonstrated microscopically. Therefore, there is no advantage from this standpoint in prolonging the interval before operation, and the operation can take place as soon as the proper amount of irradiation has been given into the tumor areas, which we are estimating to be about 900 r to 1200 r. I have seen tumor tissue reduced to half size within two weeks. Webster observed a case with multiple recurrent skin nodules. He treated one nodule and protected the others for control. He found almost complete regression of the treated nodule in two weeks' time following 600 r. This tumor belonged to microscopic Grade 4 and was a recent recurrence.

The pre-operative irradiation renders the normal tissues less receptive to implantation. Biologic experiments (Mur-

phy, and Russ and Scott) indicate that, in addition to the effect of the irradiation on the malignant cells, there is an effect on normal tissue which is detrimental to implantation of carcinoma. Russ and Scott have utilized rats and have exposed to the irradiation two of the opposing quadrants of the outer two-thirds of a circle of skin in the flank protecting the central area of the circle, and the other two quadrants. They then implanted malignant disease (sarcoma and carcinoma) in the unexposed center. In all instances, the tumor tissue grew by preference into the unirradiated areas. This effect was evident even when as little as 50 per cent, or as much as 200 per cent, of an erythema dose was used. It was also effectual even when the irradiation was given three days preceding the inoculation, or three days after inoculation. This retardation of growth was observed (1) when the entire rat was irradiated by repeated small doses of roentgen rays, and then inoculated; (2) when the inoculated tumor was protected and the surrounding tissue exposed; (3) when the test tumor was compared with control inoculation into unexposed tissue in the same animal, or with different animals.

Nakahara gave an erythema dose of X-rays over the left groin of 16 mice. Seven days later, when a mild erythema appeared, both the right and left groin were inoculated intra-cutaneously with like grafts of Bashford Adenocarcinoma 63. Six of the 16 mice were killed, a pair at a time, 48 hours, four days and seven days after the cancer inoculation. The remaining ten mice were killed in pairs, 24 hours, 48 hours, three days, five days and seven days after cancer inoculation. These grafts were then studied microscopically.

He summarizes his results as follows: "Cancer cells implanted in a skin region previously exposed to an erythema dose of X-rays show a series of degenerative changes in every way comparable to the frequently described stages of cancer cell degeneration following X-ray treatment. The findings contrast strongly with the survival and growth of grafts implanted in unexposed regions in the same animal. Since the changes are the same, whether the cancer cells have been directly exposed *in situ* or merely implanted in the previously exposed skin, it follows that it is impossible to establish microscopically a direct injury from the X-raying as the principal factor in the therapeutic action of X-rays on cancer."

Grand more recently has made studies bearing upon this subject. He irradiated tumors with various dosages, and then removed them at different intervals for transplanting and culturing. Transplants of tumors removed within three hours after irradiation with 2,000 r continued to grow in more than 85 per cent of the cases, whereas all tumors left *in situ* regressed. Transplants from tumors left in the host for forty-eight hours or longer after irradiation gave progressively fewer successful growths the longer the period before removal. Histologically, the irradiated tumors showed a progressively increasing accumulation of granulocytes, which was directly related to the diminishing number of successful transplants. Evidence against the assumption that the delay in transplantation may permit a manifestation of latent effect of the irradiation is found in the following tissue culture studies. Fragments of the irradiated tumors put in tissue culture within three hours grew luxuriantly, and there were many apparently normal mitotic figures. These cultures, transplanted to normal mice, continued to grow, even when the cultures were 28 days old. This indicates that tumor regression following irradiation must be ascribed to more than a direct effect on the tumor cells. One of the host

reactions which may be a factor is an acute inflammation in which granulocytes predominate.

Fragments of Sarcoma 180, irradiated *in vivo* with 5,000 and 10,000 r and removed immediately from the host, were transplanted into normal mice and also cultured. The animal transplants grew in a few cases only. The cultures showed a luxuriant migration of tumor cells with numerous mitotic figures. The mitoses, however, were irregular and in most cases, involved the nucleus only, without subsequent cytoplasmic division. These tissue cultures were inoculated into mice at intervals of from three hours to 28 days. With transplants from cultures of tumors exposed to 10,000 r *in vivo,* growth was obtained only from cultures less than five days old. These experiments are being continued in an attempt to determine the nature of the apparent progressive deterioration of culture of tumors exposed to intensive irradiation.

With these facts in mind, pre-operative irradiation is definitely indicated, especially in carcinoma of the breast in clinical Stage II. This pre-operative treatment which I recommend can be given in approximately two weeks, and the patients can be operated on usually during the third week. There is, therefore, no great delay in the operation and such irradiation will not interfere with the technical procedures of the operation itself. Pre-operative treatment has been recommended by me since 1915, but until recent years relatively few cases have been referred for such treatment, and not enough patients have been given this short type of pre-operative treatment to make any statistical statement of great value. We have not found that this type of pre-operative irradiation interferes with the healing of the wound. Concerning pre-operative treatment, Berven says: "In all instances, we have found advanced cancer contract in size and become more movable, but we have never seen a tumor increase in size from the first day in which we began treatment." This observation has also been made by Jüngling. The pre-operative treatment has been proved, therefore, a definite interference with cancerous growth lasting at least six or eight weeks.

In the past, "pre-operative" treatment has included three types of cases: (1) those of clinical Stage II, described above; (2) those belonging to Steinthal Group IIc, which are doubtfully operable but which, by prolonged treatment and after an interval of two or more months, are sometimes operable. For the sake of brevity, I will confine this discussion of pre-operative and post-operative irradiation to the group of cases with axillary nodes, but which are still clearly operable (Stage II).

Theoretical and Biologic Considerations for Post-Operative Irradiation

Local post-operative treatment is intended (1) to destroy any malignant cells that may have been transplanted during operation; (2) to destroy any microscopic remnant of cancerous tissue which the surgeon may have missed, and (3) to render the normal tissue more resistant to cancerous growth. Definite evidence of implantation is furnished by the observance of stitch-hole recurrences. Other more frequent implantations probably occur under the skin flap. It is our impression that remnants of cancerous tissue are rendered more malignant and also more radiosensitive by the congestion following the traumatism of operation. It is generally admitted that local and regional recurrences are the result of incomplete operation, but since 38 per cent of the failures have local recurrences, and 15 per cent axillary recurrences (Creyssel and Morel), it is seen that the regional recurrences indicate incomplete operation in 53 per cent of

the failures. All my recommendations are intended not to replace surgery, but to lesson the failures connected with surgery, for those clinics where the basic principles of radio-therapy have been followed most closely, and where the radiologists have mastered a good technic, post-operative irradiation has become a routine procedure in all cases in which the disease has spread beyond the mammary gland. Hintze states that 80 per cent of the cases of breast cancer in the University Surgical Clinic in Berlin receive post-operative treatment, and is advised by him in all operated cases. It is the accepted procedure in most of the large clinics both in this country and abroad.

Time for Post-Operative Irradiation.—A review of my own records, as well as a study of the literature, shows that many patients are sent for "post-operative" treatment at a time when they actually have evidence of recurrent disease. It is my opinion that to obtain the most benefit from post-operative treatment, the patient should be referred as soon after the operation as her general condition and circumstances will permit, which is usually within ten days or two weeks, even though the wound is not entirely healed. This is especially important if no pre-operative irradiation has been given. If pre-operative treatment has been given, it may be well to wait three weeks after the end of the pre-operative treatment. I have found, and in this Webster agrees, that early recurrences are more likely to be radiosensitive than the same recurrence after it has become firmly established in its location. Theoretically, one can assume that tissue of microscopic size is more easily destroyed than the same tumor after it has become macroscopic. This makes it important to give the irradiation as soon after the operation as is practical. We have not found that post-operative irradiation interferes with the healing of the wound, nor have we found that the wound breaks down because of post-operative irradiation, providing one does not exceed the "saturation dose."

Ovarian Sterilization as a Pre-Operative or a Post-Operative Prophylactic Measure

It is well known that cancer of the breast is more malignant in young women (Sistrunk and MacCarty, Lee, Dresser). Lee says: "Of the patients 40 years and under, 27 per cent were alive and well at the end of five years, whereas, of those over 40 years of age, 45 per cent were alive and well at the end of five years." Dresser finds that "of 48 women under 40, treated by radical mastectomy, only 12.5 per cent were free from disease at the end of three years." Cancer of the breast also grows more rapidly during pregnancy (Bagg, Steel). Trout collected 15 cases in which pregnancy occurred after operation, and of these 87 per cent developed carcinoma in the remaining breast. Therefore, pregnancy should be avoided when cancer of the breast is present. Experimental evidence indicates that the ovarian hormones stimulate the production of cancer of the breast in animals which have any susceptibility (Loeb, Lacassagne, Gardner). In recurrent or metastatic disease from cancer of the breast, oophorectomy (Schinzinger, Beatson, Lett, Boyd, Torek, Thomson, Paterson) and also ovarian sterilization by irradiation (Foveau de Courmelles, Dresser, Sittenfield, Hoffman, Ahlbom, Witherspoon, Wintz) have been followed in a considerable number of cases by a disappearance of the lesions. A woman who has had carcinoma of the breast is proved to be susceptible to the disease, and Harrington's statistics indicate that 75 per cent of the operable cases have remnants of the disease in the system after operation, or

they would not have died of the disease within five years. Consequently, any stimulation in such cases is likely to shorten life. Therefore, I recommend ovarian sterilization in all women who are still having menstruation. Reports by Torek and statistics by Ahlbom seem to indicate some value of ovarian treatment even after the menopause. Ahlbom says: "The mode of reasoning on which these experiments have been based has been that a certain internal secretory function remains in the ovaries for some little time after the menopause." Dresser, on the other hand, has not been able to recognize any benefit after the menopause.

Trout says: "The true value of irradiation of the ovaries is as yet uncertain, but it is my practice to give such treatments. After a radical operation for the primary lesion, the frequency with which carcinoma develops in the remaining breast, when the patient becomes pregnant and the remaining breast begins to lactate, is an additional reason to sterilize such comparatively young patients by irradiation of the ovaries. If the patient has passed the menopause, post-operative irradiation of the ovaries is done regardless of the fact that these patients have ceased to menstruate."

Technic for Treatment

Short Pre-Operative Treatment.*—This will apply to that group of cases which is still clearly in an operable stage, but in which the disease is no longer confined to the mammary gland. The object in this group of cases is to devitalize the more malignant type of cells with moderate dosage without causing undue delay or interference with the operation itself. Ordinarily, I aim to finish this pre-operative treatment in approximately two weeks. If ovarian sterilization is given as part of the pre-operative treatment, three weeks will be required. During this time, I give approximately 900 r to 1,200 r through each side of the breast and through the axillary and supraclavicular region, each portal being separated sharply. The cross-fire value of this will equal approximately 900 r to 1,200 r in the diseased area.

Post-operative Irradiation.—I have been confining my post-operative irradiation to the side of the chest from which the tumor has been removed, including the axilla, supraclavicular region and mediastinum. It is impractical to treat the entire body. Creyssel and Morel have found 73 per cent of recurrence and metastases in this region (scar and skin, 38 per cent; axillary, 15 per cent; supraclavicular and carotid region, 20 per cent; bone, 20 per cent; pleuropulmonary, 19 per cent; liver, 2.4 per cent; other breast, 2.4 per cent; other axilla, 2.4 per cent; peritoneum, 1.6 per cent). This treatment is usually begun two weeks after the operation. I use high voltage rays for the treatment of the supraclavicular and the axillary region, but for the operative field, extending from the posterior axillary line to the opposite parasternal line, I have been using low voltage rays with 2 mm. of aluminum filtration, so as to get more surface effect and avoid damaging effect to the lungs. I aim to give over these entire areas from 1,800 r to 2,400 r, counting both the pre-operative and post-operative treatment, endeavoring to get a very definite erythema. Usually there is actual desquamation of the surface skin before I have finished. *(For details of technic, see previous reference—The Caldwell Lecture.)*

Results.—Relatively few cases having had both pre-operative and post-operative treatment have been reported up to date, but all of the authors who have had such experience are convinced that it is of definite value. There have been a

*The technic is discussed in more detail by the author in "The Treatment of Carcinoma of the Breast: Caldwell Lecture, 1937." Am. J. Roentgenol. and Rad. Ther., 39: January, 1938.

TABLE II.—RECENT COMPARATIVE STATISTICS FROM THE SAME CLINICS

SURGERY ALONE				SURGERY AND IRRADIATION			
		PERCENTAGE LIVING 5 YEARS				PERCENTAGE LIVING 5 YEARS	
AUTHOR	NO. OF CASES	STAGE II	ALL OPERATED CASES	AUTHOR	NO. OF CASES	STAGE II	ALL OPERATED CASES
Siemens	104	33.6		Siemens	188	53.2	
Harrington*	604	24.3		Harrington	1447	28:8	
Gentil & Guedes	42	20.6		Gentil & Guedes	83	42.5	
Adair		20.0		Adair		23.0	
Hintze	656		35.0	Hintze	183		40.6
Portmann	85		30.5	Portmann	99		53.0
Ganz (Schinz)	3599		31.2	Ganz (Schinz)	118		40.0

*The surgery in this group of cases, reported by Harrington, was done in the Mayo Clinic, but the post-operative irradiation was given mostly by radiologists scattered throughout the country. It is self-evident that, under such circumstances, the irradiation is not likely to be on such a relatively high plane as the surgery.

Remarks: It can be seen that the end-results have been improved by post-operative irradiation, as compared with operation alone, from 11.4 per cent to 73.7 per cent in all cases, and when applied to Stage II, from 15 per cent to 110 per cent, according to different authors.

great many more cases recorded which have had post-operative treatment (Tables II, III, and IV).

COMMENT

It will be seen from a study of these tables that in those clinics where great attention is given to the details of technic and the principles of roentgen therapy are thoroughly followed, post-operative treatment approximately doubles the patient's chance of a five-year recovery. The radiologic skill and thoroughness is of equal importance with the surgical skill. The number of cases recorded to date are too small to draw any accurate conclusions regarding pre-operative treatment, but there are sufficient theoretical and even practical observations to justify a wider application of pre-operative and post-operative irradiation in carcinoma of the breast. According to the technic outlined, an operation should not be delayed more than about two weeks, and those who have paid close attention to this point are convinced that such delay does not add to the patient's risks.

More and more surgeons and special cancer clinics are taking advantage of the value of post-operative treatment. Dr. André Tailhefer of Paris, giving reports on cancer of the breast operated and treated at the Curie Foundation and at the Hotel-Dieu, concluded that radical operation will be followed by cure in a relatively high percentage of cases, providing that only favorable cases are selected for operation; hence he carried out the radical procedure only in cases in which the tumor did not exceed from 4 to 5 cm. in diameter, and there was slight or no involvement of axillary lymph nodes. If the microscopic examination confirms the absence of such an extension, nothing further is done. If, however, the axillary nodes are shown to be invaded, post-operative roentgen or radium treatment is directed toward the supraclavicular and internal mammary chains of lymph nodes.

"To patients presenting a tumor more than 4 or 5 cm. in diameter, accompanied by evident involvement of the axillary nodes, seen on gross or microscopic examination, preoperative roentgen irra-

TABLE III.—SURGERY PLUS POST-OPERATIVE ROENTGEN THERAPY SYMPTOM-FREE 5 OR MORE YEARS*

	1902-1922			1922-1936							1902-1936	
	TOTAL	WITHOUT GLANDS	WITH GLANDS	TOTAL	STAGE I	% WELL	STAGE II	% WELL	STAGE III	% WELL	TOTAL	% WELL
WELL 5 YEARS	81	35—66%	46—41%	78	39	77	37	54	2	11	159	52
DIED OF CARCINOMA	85	18	67	59	12		31		16		144	
DIED OF INTERCURRENT DISEASE	8			10							18	
NOT TRACED	19			5							24	
TOTAL	193 = 42% WELL			152 = 51% WELL							345 = 52% WELL	

*These statistics were prepared by the author's associate, Dr. L. B. Rentschler. They do not include 512 recurrent cases of which 95, or 18.5 per cent lived 5 years, or the 284 primary cases (not proved with biopsy, many totally inoperable) of which 106, or 37 per cent lived over 5 years.

diation is given for a month before the radical operation."

Professor Ducuing of Toulouse, reporting on 243 cases, says that perhaps a higher rate of five-year survivals may be attained by combining radical procedures with post-operative irradiation.

Hugh H. Trout, in his Chairman's Address before the Surgical Section of the American Medical Association, June 16, 1938, says: "In general, I feel that pre-operative irradiation should be given in each case, providing this can be done without injury to the patient. If the patient is a young woman with an actively enlarging malignant growth, I feel that intensive pre-operative irradiation is imperative. I have seen many such cases in which the activity of the malignant condition and its associated infection were apparently decreased and a condition of questionable operability converted in several weeks into a safe, sane and operable risk.

"It is reasonable to presume that pre-operative irradiation makes any young active and unattached cancer cells at least somewhat dormant and thereby less apt to be transplanted by any undue manipulation during the operation."

SUMMARY

(1) The greatest improvement in the results of treatment of carcinoma of the breast will be obtained by early diagnosis and operation in Stage I. If the diagnosis is correct, no pre-operative or post-operative X-ray treatment should be required. (2) In Stage II, when the disease is no longer localized, the patient's chances of five-year recovery will be approximately doubled if the

TABLE IV.—PATIENTS SYMPTOM-FREE 5 YEARS AFTER TREATMENT WITH SURGERY PLUS PRE- AND POST-OPERATIVE ROENTGEN THERAPY*

	STAGE I			STAGE II			STAGE III		
	WELL 5 YEARS	DIED OF CARCINOMA	% WELL	WELL 5 YEARS	DIED OF CARCINOMA	% WELL	WELL 5 YEARS	DIED OF CARCINOMA	% WELL
SURGERY WITHIN 30 DAYS	11	2	85%	18	15	54%	3	8	18%
SURGERY IN 30-60 DAYS	2	2	50%	5	3	63%	1	3	25%
SURGERY AFTER 60 DAYS	8	3	73%	6	6	50%	0	13	0
TOTAL	21	7	75%	29	24	54%	4	24	14%
DIED OF INTERCURRENT DISEASE		1			3			3	
NOT TRACED		0			3			1	
	TOTAL 29 CASES, OR 72%			TOTAL 59 CASES, OR 49%			TOTAL 32 CASES, OR 12.5%		

*This table was prepared by the author's associate, Dr. L. B. Rentschler. It is realized that since these statistics are based upon small numbers, they have only suggestive value.

operation and the irradiation are combined, and both are skillfully and thoroughly done. (3) Both the pre-operative and post-operative irradiation seem to offer a definite advantage. (4) Interruption of the function of the ovaries should improve the permanent results.

BIBLIOGRAPHY

Adair, F. E.: Effect of Pre-operative Irradiation in Primary Operable Cancer of the Breast. Am. J. Roentgenol. and Rad. Ther., 35:359-379, 1936

Ahlbom, H.: Castration by Roentgen Rays as Auxiliary Treatment in Radiotherapy of Cancer Mammæ at Radiumhemmet, Stockholm. Acta Radiol., 11:614-633, 1930

Bagg, H. J.: Further Studies on Relation of Functional Activity to Mammary Cancer in Mice. Am. J. Cancer, 27:542-550, 1936

Beatson, G. T.: On the Treatment of Inoperable Cases of Carcinoma of the Mamma. Lancet, 2:104-107; 162-165, 1896

Berven, E.: In Lazarus: Handbuch der gesamten Strahlenkunde. J. F. Bergmann, München, 1928

Billroth Clinic: Quoted by Meier, U. M. Beitr. z. klin. Chir., 140:632-668, 1927

Bloodgood, J. C.: Discussion. J. A. M. A., 103:1209, 1934

Idem: Permanent Results of Irradiation for Inoperable Cancer. Am. J. Surg., 28:490-497, 1935

Boyd, S.: On Oöphorectomy in Cancer of the Breast. Brit. Med. J., 2:1161-1167, 1900

Creyssel, and Morel, A.: Réflexions sur 218 Observations de Cancer du Sein. Bull. Assoc. franc. p. l'étude du cancer, 25:7-24, 1926

Dawson, E. K., and Tod, M. C.: Prognosis in Mammary Carcinoma in Relation to Grading and Treatment. Edinburgh M. J., 41:61-98, 1934

Dresser, R.: Effect of Ovarian Irradiation on the Bone Metastases of Cancer of the Breast. Am. J. Roentgenol. and Rad. Ther., 35:384-391, 1936

*Ducuing: Discussion. J.A.M.A., 111:1393, Oct. 8, 1938

Ewing, J.: Neoplastic Diseases. 3rd Ed., W. B. Saunders Co., Philadelphia, 1928

Foveau de Courmelles: Action Atrophique Glandulaire des Rayons X. Compt. rend. Acad. d. sc., 140:606, 1905

Ganz, E.: Das Schicksal der im Röntgeninstitut behandelten Mammakarzinompatienten der Jahre 1920-1932. Strahlentherapie, 57:413-444, 1936

Gardner, W. U., Smith, G. M., Strong, L. O., and Allen, E.: Experimental Production of Malignant Growths in Mice by Estrogenic Chemicals. J.A.M.A., 107:656-657, 1936

Gentil, F., and Guedes, B.: Arq. de patol., 2:122, 1928

Grand, C. G.: Transplantability of Mouse Sarcoma 180 When Irradiated *in Vivo*. Am. J. Cancer, 36:540, 1939

Halsted, W. S.: Results of Operations for Cure of Cancer of Breast Performed at Johns Hopkins Hospital from June, 1889, to January, 1894. Ann. Surg., 2:497-555, 1894

Harrington, S. W.: Carcinoma of Breast: Surgical Treatment and Results Five, Ten and Fifteen Years After Radical Amputation. Surg., Gynec. and Obst., 56:438-441, 1933

Idem: Unilateral Carcinoma of the Breast Treated by Surgical Operation and Radiation. Surg., Gynec. and Obst., 60:499-504, 1935

Hintze, A.: Die Erfolge der Operaiven und der Bestrahlungsbehandlung beim Carcinom der Haut und der Brustdrüse. Bericht über 2000 Fälle. Arch. f. klin. Chir., 173:429-444, 1932

Idem: Unsere Fortschritte bei der Behandlung des Brustkrebses durch Nachbestrahlung. Die Tangential bestrahlungsmethod. Strahlentherapie, 41:601-646, 1931

Hoffman, W. J.: Spontaneous Disappearance of Metastatic Nodules from Carcinoma of the Breast, Following Irradiation of Ovaries. Surg. Clin. North Am., 13:494-498, 1933

Holman, E.: Cancer: The Menace of Repeated Examinations. Surg., Gynec. and Obst., 55:667-669, 1932

Hutchison, R. G.: Value of Radiation Therapy in Treatment of Carcinoma of Breast; Critical Analysis of Published Statistics. Surg., Gynec. and Obst., 62:653-664, 1936

Jüngling, O.: Ueber das Operieren und die Wundheilung im röntgenvorbestrahlten Gebeit mit besonderer Berücksichtigung des Mamma-Carcinoms. Arch. f. klin. Chir., 173:445-456, 1932

Idem: Fortschritte in der Behandlung des Mamma-Karzinoms. Fortsch. d. Therap., 9:136-139, 1933

Lacassagne, A.: Apparition de cancers de la mammelle chez la souris mâle, soumise a des injections de folliculine. Compt. rend. Acad. d. sc., 195:630, 1932

Idem: Influence d'un facteur familial dans la production, par la folliculine, de cancers mammaires chez la souris mâle. Compt. rend. Soc. de biol., 114:427-429, 1933

Idem: Sur la pathogénie de l'adénocarcinome mammaire de la souris. Compt. rend. Soc. de biol., 115:937-939, 1934

Idem: Un cancer d'origine hormonale l'adénocarcinome mammaire de la souris. Paris méd., I:233-240, 1935

Idem: Hormonal Pathogenesis of Adenocarcinoma of Breast. Am. J. Cancer, 27:217-228, 1936

Lee, B. J.: End-results in Treatment of Cancer of Breast by Radical Surgery Combined with Pre-operative and Post-operative Irradiation. Am. J. Surg., 20:405-443, 1933

Lett, H.: Analysis of 99 Cases of Inoperable Carcinoma of the Breast Treated by Oöphorectomy. Lancet, I:227-228, 1905

Lewis, D., and Rienhoff, W. F., Jr.: Study of Results of Operations for Cure of Cancer of Breast Performed at Johns

Hopkins Hospital from 1889 to 1931. Ann. Surg., 95:336-400, 1932
Loeb, L.: Estrogenic Hormones and Carcinogenesis. J.A.M.A., 104:1597-1601, 1935
Loeb, L., Burns, E. L., Suntzeff, V., and Moskop, M.: Sex Hormones and their Relation to Tumors. Am. J. Cancer, 30:47-54, 1937
MacCarty, W. C.: Cytologic Diagnosis of Neoplasms. J.A.M.A., 81: 519-522, 1923
Murphy, J. B.: J. Exper. Med., 1921
Nakahara, W.: Studies on X-ray Effects. Histologic Study of the Fate of Cancer Grafts Inoculated into an X-rayed Area. J. Exper. Med., 38:309-314, 1923
Paterson, P.: Effect of Oöphorectomy and Splenectomy on Cancer of Breast and Uterus. Lancet, I: 1402-1404, 1936
Portmann, U. V.: Comparison of Results in Series of Cases of Carcinoma of Breast Treated by Post-Operative Roentgen Therapy for Prophylaxis with Similar Series in which Operation Was Only Treatment. Am. J. Cancer, 27: 1-25, 1936
Russ, S., and Scott, G. M.: Growth of Tumor in Tissues Exposed to X-rays and Radium. Brit. J. Radiol., 32: 289-295, 1927
Schinzinger: Chir. Kong., I: 28, 1889
Idem: Das Karzinom der Mamma. München. med. Wchnschr., 52: 1724-1725, 1905
Siemens, W.: Ueber die Erfolge der Nachbestrahlung radikal operierter Mammakarzinome. Strahlentherapie, 47: 627-630, 1933
Sistrunk, W. E., and MacCarty, W. C.: Life Expectancy Following Radical Amputation for Carcinoma of the Breast. Ann. Surg., 75: 61-69, 1922
Sittenfield, M. J.: Sterilization of Ovaries as Auxiliary Treatment in Cancer of Breast. Radiol. Rev. and Mississippi Valley M. J., 59: 41-43, 1937
Steel, D.: Radiation Castration in Treatment of Malignancy of Breast. Radiol., 26: 700-705, 1936
Steinthal, C. F.: Quoted by Lynham in Proc. Third International Cong. Radiol., Paris, 1931, p. 417
*Tailhefer, Andre.: Discussion. J.A.M.A., 111:15; 1393, Oct. 8, 1938
Thomson, A.: Analysis of Cases in which Oöphorectomy was Performed for Inoperable Carcinoma after Removal of the Ovaries. Ann. Surg., 60: 476, 1914
Torek, F.: Disappearance of Recurrent Mammary Carcinoma after Removal of the Ovaries. Ann. Surg., 60: 476, 1914
Trout, H. H.: Carcinoma of the Breast. Surg., Gynec. and Obst., 65: 370-375, 1937
Idem: Symposium on Treatment of Carcinoma of the Breast. J.A.M.A., 111: 489-492, Aug. 6, 1938
Webster, J. H. D.: Cancer of Breast; X-ray and Radium Treatment of Operable and Inoperable Cases. Brit. M. J., 2: 47-50, 1932
Wintz, H.: Fourth International Cong. Radiol., Zurich, 1934, p. 401
Witherspoon, J. T.: Roentgen Irradiation of Ovaries as Supplement to Surgical and Radium Therapy for Mammary Cancer. Arch. Surg., 33: 554-559, 1936
*Discussion in Symposium on Cancer of the Breast, Foreign Letters. J.A.M.A., 111: 15; 1393, Oct. 8, 1938

SUMARIO

Los mejores resultados en el tratamiento del carcinoma de la mama se obtienen en los casos de evolucion clinica corta que son diagnosticados y operados cuando el carcinoma todavia se encuentra en el estado I. Cuando el diagnostico es correcto en estos casos no es necesario usar la radioterapia pre-o post-operatoria. En los casos que se encuentran en el estado II cuando el carcinoma ya se ha difundido los mejores resultados se obtienen cuando se combina la cirujia con la radioterapia pre-y post-operatoria. Con esta forma de tratamiento aproximadamente se dobla el numero de casos que sobreviven cinco años o mas. La interrupcion de la funcion de los ovarios aparece que mejora los resultados permanentes.

RÉSUMÉ

Dans le traitement des carcinomes du sein, on obtéent les meilleurs resultats en faisant un diagnostic et une opération précoces. Si le diagnostic est correct, il n'est pas nécessaire d'avoir recours au traitement, par les rayonsx, avant ou après l'opération. Si les lesions ne sont pas localisées on double les chances de guérison de cinq années, en combinant l'opération et l'irradiation. Les meilleures résultats sont obtenus par une extirpation et une irradiation radicales. L'emploi d'irradiation pré- et post-opératoire posède des advantages rèlls. L'anéantissement des fonctions ovariennes devrait améliorer les résultats permanents.

Выводы

Улучшение в результатах лечения карциномы груди быдет возможно только посредством раннего распознания и операции в первом периоде. Если диагноз правилен, то не нужно ни передоперационного ни после-операционного облучивания рентгеновскими лучами.

Шансы на пятилетние выздоровление во втором периоде, когда болезнь уже не локализированна, улучшаются на двое если операция и облучивание проводятся вместе и основательно.

Перед-операционное и после-операционное облучивание приносит пользу.

Перерыв функции яичников улучшает результаты.

Miometrectomia
(Myometrectomy)

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SUMMARY

Myometrectomy attains the utmost possible reduction in the size of the uterine body by resection of the mural myometrium. This is accomplished whether it is performed as a typically outlined procedure following myomectomies, hysterectomies, subtotal or supravaginal partial amputation of the body. It leaves behind a sufficient surface of endometrium which cannot be attained by any other procedure. This procedure frustrates the anatomic and functional sequelæ which usually develop as a result of the presence of a large uterine fundus. It permits thorough exploration and removal of small fibromatous nodules which otherwise might be overlooked, with conservation of a large surface of endometrium which will re-establish in a normal manner the catamenial bleeding in young patients. This is of great importance, particularly because of its great value from an endocrinologic viewpoint, preventing anatomic and functional changes in the ovaries, providing, of course, that they continue to act synergistically.

LA ETIMOLOGIA del término "miometrectomia" define á una neuva técnica para el tratamiento de los fibromiomas uterinos que desde. Marzo de 1937 practicamos.

Tratando de respetar una superficie vasta con espesor mínimo de endomiometrio, para mantener así con el ovario que queda el estado de sinergía funcional exigible, reduce, como no lo hace ninguna otra técnica, á expensas de la resección tam amplia que efectúa del miometrio, el tamaño global de la porción de útero que queda; permitiendo á la vez una prolija búsqueda y una mejor extirpación de los pequeños nódulos que, de no ser así, podrían pasar desapercibidos.

Halla su indicación siempre que no sea posible ó no sea necesario conservar la función gestativa, y puede ser aplicada sea como operación tipica y reglada, sea también como tiempo agregado en las histerectomias altas y amputaciones parciales del cuerpo.

Siendo menos conservadora que la miomectomia, ya que esta contempla y llega hasta restaurar la función gestativa, no es menos cierto tambien que no conviene prodigarla tan generosamente —como con relativa frecuencia se observa todavia—debiéndose antes estudiar la edad de la paciente en sus relaciones con el pasado y el porvenir obstétrico de ella, si es que no deseamos caer bajo la censura, injusta pero explicable, de una enferma que, defraudada de sus deseos de ser madre despues de esta operación, tiene que soportar, al cabo de poco tiempo, la aparición de una mal llamada recidiva tumoral; cuando no también las molestias que crea la existencia en la excavación pelviana de un órgano grande, congestivo, doloroso y duro, inevitable secuela que dejan las

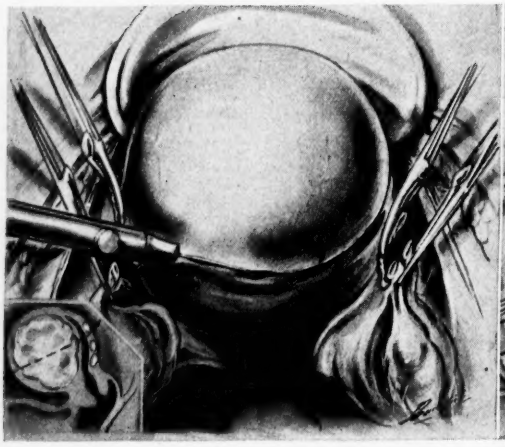

Fig. 1. Sección, prévia hemostasia con pinzas de Faure, de ambas trompas, ligamentos redondos y ligamentos útero-ováricos.

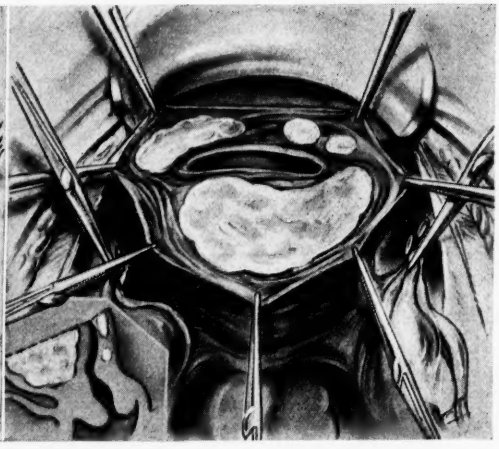

Fig. 2. Amputación transversal del cuerpo con bisturi electrico, por arriba de donde se ha hecho la hemostasia de las uterinas, sin reparar en los miomas que pueden interponerse y que son seccionados ó enucleados, según la conveniencia.

miomectomias debido á la hiperplasia difusa existente alrededor de los sitios donde se hallaban implantados los nódulos, y, que los "capitonages," hechos en los espacios vacios que quedaron despues de efectuada la enucleación, se encargan á la vez de aumentar.

Es por tales asertos—ratificados tras una ya larga experiencia—que no dudamos estar en lo cierto al decir que, para justipreciar mejor las bondades de la miomectomia, solamente debemos indicarla en aquellas pacientes que, no habiéndo tenido hijos y deseando tenerlos, no hayan llegado á los 40 años de edad; pues en enfermas con vários hijos y aun con menos años, no titubeamos en practicar siempre la miometrectomia, que la hacemos extensiva también para las que llegan á los 45 años, época esta de la vida que en nuestro ambiente consideramos como inicial de la menopausia y que, por tal motivo, á partir de ella, nos obliga a reemplazarla por la histerectomia.

He aquí la técnica de la miometrectomia:

1. Sección, prévia hemostasia con pinzas de Faure, de ambas trompas, ligamentos redondos y ligamentos útero-ováricos (Fig. 1).
2. Rechazo de estos elementos hácia afuera, y disección del colgajo peritoneal anterior, lo que permite hacer la ligadura de las uterinas.
3. Amputación transversal del cuerpo con bisturi electrico, por arriba de donde se ha hecho la hemostasia de las uterinas, sin reparar en los miomas que pueden interponerse y que son seccionados ó enucleados, según la conveniencia (Fig. 2).
4. Viaciamiento miometral ó miometrectomia propiamente dicha (preferentemente con bisturi eléctrico) de las paredes uterinas, como lo esquematizan las Figuras 3 y 4; llevandose esta excéresis lo más hácia abajo posible, para extirpar así los pequeños nódulos que podrían existir, no apreciables á la vista y á la palpación.
5. Síntesis, con puntos sero-serosós de catgut, de los bordes de los colgajos superficiales mioperitoneales, incluyendose en ambas extremidades las porciones internas de ambas trompas, ligamentos redondos y ligamentos útero-sacros (Fig. 5). El cierre de los colgajos internos miomucosos (cilindro interno endomiometrial) que antes haciamos previamente y en las mismas forma, por considerarlo innecesario, no lo hacemos hoy.
6. Peritonización (Fig. 6).

Tal es la técnica de la miometrectomia típica y reglada. Sin embargo, debemos hacer presente también que, en ocasiones, dada la topografia, número y volúmen de los núcleos, obligados estuvimos a proceder circunstancialmente, pero sin variar la finalidad esencial que persigue.

Fig. 3. Viaciamiento miometral ó miometrectomia propiamente dicha (preferentemente con bisturi eléctrico) de las paredes uterinas, como lo esquematizan.

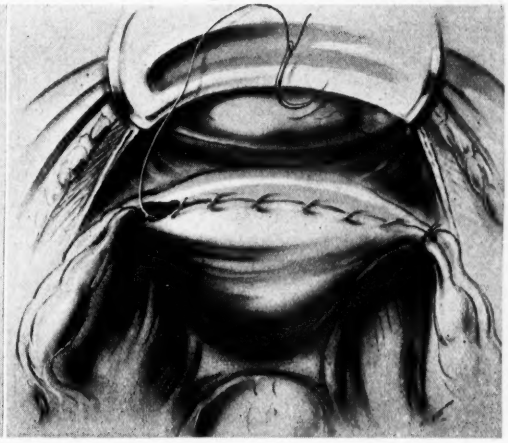

Fig. 4. Llevándose esta excéresis lo más hácia abajo posible, para extirpar así los pequeños nódulos que podrían existir no apreciables á la vista y á la palpación.

Y tan es así que, mas de una vez nos hemos visto en la necesidad de sacrificar toda una pared del útero, conservando casi en su totalidad la opuesta que, miometrectomizada de inmediato, pudo por esto ser suturada, por su borde libre a la porción cervical, en el mismo sitio donde fué seccionada la otra.

Como se ve, pues, esta técnica puede ser indicada también en cualquiera de las amputaciones parciales del cuerpo uterino, debiéndo ser considerada en estas circunstancias, como un tiempo casi siempre imprescindible de ellas.

Desde Marzo de 1937, setenta y siete veces la hemos practicado (69 en el servicio y 8 en nuestra clínica privada), habiéndose ratificado por histerografia la nueva cavidad, de tamaño y forma variables, como es lógico suponer.

La conservación de esta vasta superficie de endometrio, siguió dando cumplimiento al acto hemorrágico menstrual, contribuyendo, al mismo tiempo, en su caracter de glándula de secresión interna, a evitar las alteraciones anatómicas y clínicas de los ovarios, ya que pudo continuar sinergícamente con estos, en su funcionalismo endócrino.

SUMARIO

La miometrectomia consigue, a expensas de la reseccion del miometrio mural, la mayor reduccion posible del cuerpo uterino, sea como operación típica y reglada, sea como tiempo operatorio, después de las miomectomias, histerectomias sub-totales atlas y amputaciones parciales del cuerpo, dejándo en su sitio una superficie tam ámplia de endometrio como ninguna otra técnica quede hacerlo.

Ese vaciamiento miometrial, a la vez que evita las secuelas anatómicas y funcionales a que expone la permanencia de un cuerpo voluminoso, permite hacer una más prolija investigación y extirpación de los pequeños nódulos que, de otra manera, podrían quedar ignorados.

La conservación en la forma que queda expuesta de una vasta superficie endometrical, permite, no sólo dar cumplimiento en forma normal al acto hemorr-

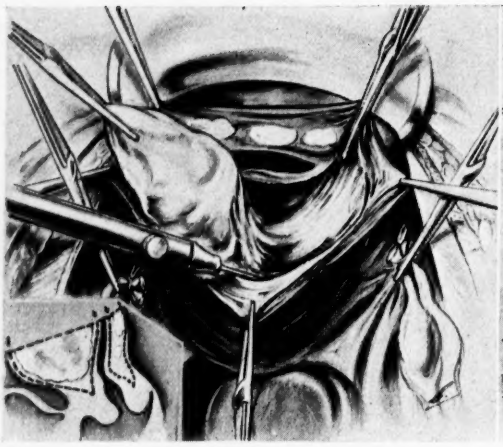

Fig. 5. Síntesis, con puntos sero-serosos de catgut, de los bordes de los colgajos superficiales mioperitoneales, incluyendose en ambas extremidades las porciones internas de ambas trompas, ligamentos redondos y ligamentos útero-sacros.

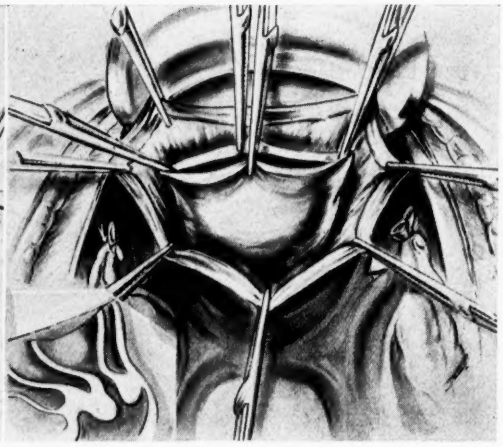

Fig. 6. Peritonización.

ágico catamenial, que para la moral de la paciente jóven es de un valor incalculable, sino que también, en su carácter de glándula de secreción interna, evitaná las alteraciones anatómicas y funcionales de los ovarios, dado que podrán seguir actuando sinérgicamente con ellos.

RÉSUMÉ

La myométrectomie obteent la reduction maximale du volume corps de l' uterus par la résection du myomètre mural. Ceci est accompli par la myomectomie par l'hystérectomie vu par l'amputation sous-totale ou supra-cervicale du corps de la matrice. Ce procédé attaque aucunement tout l'endomètre et prévient le dévelopment les sequelles anatomiques et fonctionnelles qui resultent ordinairement de la présence d'un large fundus utérin. Ce procéde permet l'enucléation des nodules fibromateux et préserve une large surface d'endomètre permettant le retablissement chez les jeunes malades des règles. Ceci est d'une grande importance du point de vue endocrinologique et empêche des changements anatomiques et fonctionnels des ovaires et permet aux ovaires d'agir synergistiquement.

Выводы

Миоментректомия дает найбольшее уменшение величины корпуса матки посредством резекции мурального миометриума. Этот результат возможен безразлично от того производителя — ли операция миомектомии, гистеректомии, субтотальной или суправагинальной ампутации корпуса матки. Оставляется достаточния полоса ендометриума, что не получается при других операциях.

Эта операция делает возможным эксплорацию и удаление малых фибрам, которых при других операциях можно не заметить, вместе с тем сохраняя большую полосу ендометриума, что в свою очередь сохранит менструацию у молодых пациентов. Этот факт очень важен с ендокринологической точки зрения, так как он предохраняет от анатомических и функциональных изменений в яичниках.

Recent Developments of Biliary Surgery

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INCIDENCE OF CHOLECYSTIC DISEASE AND BILIARY DYSKINESIA

PATHOLOGY of the biliary tract accounts for a very high percentage of patients seeking medical assistance. It is estimated that 25 per cent of women and 10 per cent of men over 40 years of age, who complain of indigestion, are suffering from disease of the gallbladder or biliary tract. Cholelithiasis is at least two and one-half times more frequent in women than in men. Women who have borne children constitute about 80 per cent who come to operation for the relief of cholecystic disease. Cholelithiasis and cholecystic disease are also more common among diabetic patients. Only about 30 per cent of all patients suffering from symptoms of cholecystic disease have gallstones in the biliary passages, 10 per cent have inflammations accountable for their distress, which leaves 60 per cent who suffer from dysfunctioning biliary systems of various degrees.

CAUSATION

It is my conviction that this disease is brought about by a catarrhal thickening and congestion of the gallbladder mucosa, with marked lymphocytic infiltration, and in the more acute cases an infection of the liver, gallbladder and biliary passages. This occurs in the acute diseases such as typhoid fever, scarlet fever, rheumatic fever, malaria, pneumonia, influenza, streptococcus, B. coli infections, etc. In all of these diseases infection enters the liver and biliary passages. Such disturbances of normal physiology produce spasm of the sphincter of Oddi.

Bile and pancreatic juice cannot drain into the lumen of the duodenum at the proper time or in normal amounts. The outlet for the fluids is intermittently or temporarily closed. The watery constituents of the bile in the gallbladder are more rapidly absorbed, leaving behind bile-sand, consisting largely of cholesterol, with some lime and magnesia. This is ultimately compressed around a nucleus consisting of some epithelial or mucoid cells, bile pigment or bacteria, which, over a period of time, is moulded into a gallstone or gallstones by the contractions of the gallbladder.

The gallbladder becomes infected through different avenues of approach. Infection can reach it by way of (1) the blood stream; (2) the lymphatics (infecting the liver), and the infected bile entering the biliary passages and gallbladder; (3) an ascending infection up the common bile and cystic ducts from the pancreas or duodenum, and (4) a direct extension of inflammation from a neighboring structure.

Cholesterol is an important constituent of bile and its metabolism can become upset by several factors. Pregnancy and post-infection periods are followed by a high cholesterol concentration. Cholesterol forms yellowish ester deposits on the mucous lining of the gallbladder. This gives it a characteristic appearance of the cholesterosis or strawberry gallbladder.

PHYSIOLOGY OF DIGESTION

The physiology of digestion is disturbed by diseases of the biliary system, pancreas and upper gastro-intestinal tract. One of the significant features of the physiology of the digestive tract is the gradual replacement of the reflex nervous mechanism by the chemical hormonal control of the secretions in the successive stages of digestion. The production of saliva is of a purely nervous origin, that of gastric juice is partly nervous and partly chemical, while that of bile, pancreatic juice and succus entericus are entirely, or almost entirely, due to chemical hormonal stimuli. Saliva hydrolyses starch into the disaccharides and assists mastication and deglutition.

The secretion of gastric juice is brought about by a reflex nervous mechanism, as well as a hormone messenger called "gastrin." The formation of this hormone in the pyloric mucous membrane of the stomach is produced by the presence of partially digested food, chiefly dextrin, which has resulted from the action of salivary ptyalin on starch. The function of gastric juice is to destroy the ptyalin ferment of the saliva, and by the action of its pepsin and hydrochloric acid to hydrolyse proteins down to peptones. Pepsin also dissolves the fatty cell envelopes, and the gastric ferment, rennin, converts caseinogen into casein.

The secretion of pancreatic juice is brought about by the action of acid-chyme from the stomach acting on the mucous membrane of the duodenum. This produces secretin, the intestinal chemical hormone. The production of another hormone-chemical-messenger, cholecystokinin, discovered by Ivy, is formed by the action of fat on the duodenal mucous membrane. This hormone causes the gall-bladder to contract, thereby bringing about a small but immediate flow of its concentrated bile.

The function of pancreatic juice, which is strongly alkaline, is to neutralize the acid-chyme as it comes from the stomach, and by the action of its three important ferments—trypsin, amylase and lipase—to bring about the completion of digestion. The proteolytic ferment "trypsin" is produced by the action of another ferment of the intestinal juice called "enterokinase." This converts trypsinogen of the pancreatic juice into trypsin, which, in the presence of bile only, can act on proteins, hydrolysing them down to amino-acids. Amylase converts starch, a polysaccharide, into its component parts, the monosaccharides, ready for absorption. Lipase acts on fats hydrolysing them into fatty acids and glycosol.

Bile is not a true digestive juice, but exercises important functions in aiding the digestive process, namely:

(1) Acid metaproteins, proteoses and peptones resulting from gastric digestion of proteins are precipitated by the action of bile salts. This converts the fluid chyme into a semi-solid medium whose progress is thereby retarded along the intestinal canal, giving longer time for the intestinal and pancreatic juices to act.

(2) Bile salts act as co-enzymes to each of the principal ferments—trypsin, amylase and lipase—of the pancreatic juice, by reducing surface tension.

(3) Bile salts promote absorption of the products of digestion. They are also necessary to carry vitamin K through the intestinal wall. Fatty acids are more rapidly brought into solution by the action of bile salts. (Note: 60 per cent of the fat goes out with the feces if bile is absent, whereas, normally, only 5 per cent appears in the stool.)

(4) Reabsorbed bile salts stimulate the liver to further bile secretion.

(5) Bile stimulates peristaltic movements of the intestines and thereby aids elimination.

While all this physiologic action of digestion is taking place, the contents of the small bowel are being slowly propelled by peristalsis along toward the colon, and subjected to a continuous mixing process during its passage through the intestine. A negligible absorption takes place in the stomach (only a little peptone, sugar and alcohol are absorbed by this mucosa). Nearly all of the food is, however, completely absorbed by the time the intestinal contents reach the lower end of the ileum. This absorption takes place through the villi of the small intestine, the greater part directly into the blood stream, and the remainder indirectly through the lymphatic system.

The details of the physiologic process of absorption of the various substances need not be discussed. Nor is it necessary to go into detail concerning the function of the large bowel, its secretion of mucin, excretion of calcium, magnesium and iron phosphates and, not forgetting its two chief functions, the absorption of water and its physiologic function of evacuation. This latter action can be seriously affected by disturbances of the normal physiologic secretions of bile and pancreatic juice.

Disturbances of Physiology.—Any serious body disturbance may and does interfere with the secretions of the digestive juices. This is true in diseases of the gastro-intestinal tract, including the liver and pancreas. It has been my experience that we have failed to relieve many of our patients who had been suffering with symptoms of cholecystic disease. These patients continued to complain of insomnia, anorexia, constipation, gaseous distension, discomfort and distress such as bloating and belching after meals, and even pain in the epigastrium, after cholecystectomy. A few of these patients developed jaundice, fever and chills.

Other surgeons have confirmed this observation and believe that in order to procure a higher percentage of cures by performing a cholecystectomy, it is necessary to open the common bile duct. This is imperative especially where the history suggested its involvement. Choledochotomy was adopted and practiced with a cholecystectomy. There remained a fairly large percentage of patients who were not benefited.

What explanation was found for this continued disturbance of their normal gastro-intestinal physiology? In a few patients this continued disturbance was thought to be due to adhesions, and in others to trauma following their previous operative procedures of all types, including dilatation of the sphincter of Oddi. While, no doubt, a few operative injuries occurred because of anatomic abnormalities of the biliary ducts encountered at operation, a number of these patients were not relieved of their symptoms following operation because of overlooked gallstones in the ducts; also inadequate biliary drainage, the result of a continuance of the spasm of the sphincter of Oddi, producing biliary stasis, and the sequelæ known as biliary dyskinesia.

BILIARY DYSKINESIA

This is a disturbed motor state of the gallbladder and the choledochoduodenal sphincter mechanism, often due to a hypertonic sphincter brought about by (1) faulty diet; (2) stricture of the common bile duct; (3) inflammation of the ampulla of Vater and the papillæ of Vater; (4) duodenitis, duodenal stasis and duodenal and gastric ulcers, and (5) disturbances of the cystic duct with infection.

Stasis in the gallbladder and common bile and pancreatic ducts predisposes to infection and more gallstones. Sphincterismus (spasm of the proprius ductus

choledochi) causes pain, often severe, in the epigastrium. Pain can be caused by a spasm of the sphincter of Oddi in apparently normal filling and functioning gallbladders.

Hypertonic contraction of this choledochoduodenal muscular mechanism may result in biliary dyskinesia, the symptoms of which may simulate the pain of cholecystic disease (Ivy and Sandblom, 1934). In addition, there are longitudinal muscle fascicles, which lie in the angle between the pancreatic and bile ducts, some of them being attached to the margins of the choledochus window. Thus, these two muscular mechanisms may serve as a force inhibiting the flow of bile into the duodenum. There is, in addition, a meshwork of fine "musculus proprius ampullæ" or "sphincter ampullæ." It consists of lateral bundles of longitudinal muscle fibers which overlie an inner circular layer. Should the sphincter ampullæ be hypertrophied, or the orifice of the choledochus narrowed by inflammatory processes, then these muscle fibres might well be factors in bringing about the reflux of bile into the pancreatic duct (Boyden et al). In addition to these main portions there are muscle fibers in some adults which completely encircle the pancreatic duct, and others, the chief function of which is to reinforce the window of the intestinal wall, over-stimulation of which will produce biliary dyskinesia.

Differential Diagnosis. — Westphal's classification of biliary dyskinesia is as follows:

(1) Hyperkinetic:
  (a) Hypermotile—increased motility of gallbladder and ampullæ, with rapid emptying of bile and relaxed sphincter of Oddi.
  (b) Hypertonic—contraction of the gallbladder against spasm of the sphincter with spastic distention and cholic pain.

(2) Atonic:
  (a) Relaxation or atony of the gallbladder with spasm of the sphincter of the papilla of Vater, causing distention of the gallbladder with mild, continuous, "heavy" aching sensation.

Lyon has also classified the motor dysfunction of the extra-hepatic passages into two types: "spastic dysfunction" and "atonic dysfunction." He suggests that in the course of time a spastic sphincter may cause the gallbladder to become atonic. Newman has used the terms "spastic distention," and cautions against the division of dyskinetic states into hard and fast entities.

In regard to this concept of dyskinesia, which maintains that biliary distress may result from a motor dysfunction of the extra-hepatic passages, Ivy wrote: "Two pertinent questions present themselves for answer: (1) Can the sphincter of the common duct or the choledochoduodenal mechanism contract with sufficient force to prevent evacuation of the contents of the contracting gallbladder? (2) Is it possible for the resulting pressure to produce pain in the noninflamed biliary passages?"

The answer to both questions is in the affirmative. The resistance of the sphincter of Oddi is two and one-half times the contractile power of the gallbladder or the secretory power of the liver. Ivy thinks this concept of biliary dyskinesia also provides a rational basis for the persistent symptoms of gallstone-colic or epigastric pain and distress even in those patients without gallstones. The pain of this so-called "cholecystitis," when a normal gallbladder is found at operation, has been described as "hepatic neuralgia."

It is not only possible, but probable, that the presence of an irritable or hypertrophied sphincter of the common duct explains the recurrence of symp-

toms in many patients following cholecystectomy. Early relief would be due to the temporary paralysis of the sphincter, if it were widely dilated at the time of the cholecystectomy. But, after recovery from this temporary paralysis, the irritable or the hypertrophic sphincter may again produce painful symptoms which are due to biliary tract distention. The recognition of this unrelieved symptomatology should emphasize the importance of continued medical and surgical management of these patients. Some who have had their gallbladders removed and have symptoms due to partial obstruction of the biliary passages are benefited by a choledochoduodenostomy.

In this connection, Aschoff reports a series of 215 cases in which 25 stone-free gallbladders were removed. Of the 25, seven had residual symptoms accountable only by the dyskinetic process. It is likely that the number of discouraging results may be fewer when the idea of a functional disturbance and persistent spasm of the sphincter is better understood and managed by both the internist and the surgeon.

CHOLECYSTECTOMY PLUS DILATATION OF SPHINCTER OF ODDI

In a cholecystectomy plus a supraduodenal choledochotomy we were surprised when, on opening the common bile duct, gallstones were present in about 20 per cent of our patients who had them in the gallbladder. After these stones were removed dilatation of the sphincter of Oddi relieved a few more patients with chronic cholecystic disease without increasing the mortality. Still a number, perhaps 20 per cent, of these patients who had been previously diagnosed as ill with cholecystic disease and who had a cholecystectomy performed, complained that (1) they had not been cured; (2) they had not been relieved; (3) the symptoms of gaseous indigestion, pain, fever attacks and, in some cases, jaundice, etc., still persisted.

SPHINCTER OF ODDI—ITS ANATOMY AND PHYSIOLOGY

Glisson (1681) first suggested that a sphincter muscle existed at the outlet of the common bile duct. Vater published his article on the orifice of the common bile duct in 1720. In 1878, Gage described for the first time the circular musculature of the ampulla of Vater. In 1887, Oddi, of Italy, described the choledochoduodenal pancreatic juice.

In 1923, and again in 1932, Westphal, of Berlin, described the sphincter of the common bile duct as composed of two parts, possessing a different structure and function. The first part consisted of a proximal muscular coat which surrounds the antrum beginning at the junction of the duct with the ampulla. The second part consists of a distal group of muscle fibers which surround the papilla and form the round sphincter outlet of the common bile and pancreatic ducts. Its nerve supply comes from the greater splanchnic and vagus nerves.

The most complete accounts of the anatomy of this sphincter in man are those of Hendrickson (1898), Nuboer (1931), Dardinski of the Mayo Clinic (1934), Schwegler and Boyden (1937), Boyden (1937), and Kreilkamp and Boyden (1937). According to Boyden and his co-workers, "the sphincter of Oddi in man, consisting of three portions, is a continuous sheath of muscle fibers extending from a level near the lower end of the ampulla of Vater. It thus invests the bile duct, the ampulla of Vater and three sides of the pancreatic duct. The sphincter of the choledochus is a sheath of circular muscle fibers which surrounds the entire intramural course of the bile duct. It reaches its greatest thickness near the upper end of the ampulla and is a zone capable of retaining

a column of bile, even in the presence of an abundant flow of pancreatic juice. Tonic contraction of this annular muscle will close this portion of the ductus choledochus and thus force the bile, continuously secreted by the liver, to enter the gallbladder."

The construction and function of this little ring of smooth muscle has a very important part to play in the process of our digestive behavior. Anatomists have proved that a definite smooth muscle sphincter exists at the entrance of the pancreatic and common bile ducts into the duodenum—the choledochoduodenal junction. The sphincter is not altogether independent of the duodenal musculature, as it is intimately blended with it. It consists of longitudinal, oblique and circular smooth muscle fibers. It has a dual nerve supply, the sympathetic fibers coming from the greater splanchnic through the celiac axis, and the parasympathetic fibers, which come from the right branch of the vagus nerve. Harting, who developed the silver impregnation method, demonstrated the distribution of the nerve plexus of the gallbladder and biliary passages. He compared the nerve supply of the bile ducts with Auerback's plexus of the gastro-intestinal tract.

The functions of the proprius ductus choledochi can be stated as follows:

(1) Filling of the gallbladder and regulating the pressure mechanism in the biliary passages; (2) preventing regurgitation of duodenal contents and possible ascending infection into the common bile and pancreatic ducts; (3) opening of the sphincter of Oddi by duodenal peristalsis, and (4) controlled by the vagi and splanchnic nerves which supply both the gallbladder and the sphincter of Oddi. These nerves regulate the timing of the biliary and pancreatic discharge into the duodenum.

Westphal reported that when the parasympathetic vagus nerve is stimulated below the diaphragm with a weak current, the gallbladder contracts, the antral portion of the ampulla of Vater manifests peristaltic movements and the papilla of Vater relaxes. He views this as being the normal type of response. On the other hand, when the sympathetic splanchnic nerve is stimulated, he reported that the gallbladder and antral portion of the ampulla relax while the sphincter proper and the papilla of Vater contract.

DISTURBANCES OF THE SPHINCTER OF ODDI

My contention is that a spasm of the sphincter of Oddi is brought about by abnormal stimuli coming from the preganglionic vagus or from fibers of the splanchnic nerves. These nerves supply the various organs of the upper gastro-intestinal tract as well as the choledochoduodenal sphincter.

The secretory function of the liver, stomach, intestine and pancreas is started by hormones, chemical messengers, i.e., gastrin and secretin. Their entrance into the bowel is regulated by the vagus and splanchnic nervous mechanism. Any pathologic process of the gastro-intestinal tract can interfere with the secretion and flow of bile, pancreatic juice and even the succus entericus, the secretion formed from the wall of the small intestine. These alkaline fluids with their ferments, which are absolutely necessary to carry on the digestion in the small bowel, are not released at the right time or in sufficient quantities to act upon the acid-chyme coming from the stomach. Normal digestion cannot take place in the small intestine because the biliary excretion of the liver, especially the strongly alkaline secretion of the pancreas, is not properly liberated. These secretions are not freed to act on the partially digested acid-chyme com-

ing from the stomach. Following a cholecystectomy, whether or not it is combined with a dilatation of the sphincter of Oddi, many patients continue to suffer from abdominal distress of flatulence, belching and gaseous indigestion. Some have fever, chills, pain and even jaundice. This occurs, in my opinion, because spasm of the sphincter of Oddi has not been permanently removed; the flow of bile and pancreatic juice into the duodenum has not been established.

My experience, like that of many others, with dilation of the sphincter of Oddi, has proved anything but satisfactory. Cutler, Zollinger and associates have pointed out that it causes trauma, edema and necrosis of the mucous membrane lining of the papilla duodeni.

Passing a dilator that measures only 7 mm., stretches the opening only temporarily. It contracts as soon as the anesthetic wears off. A 9 mm. dilator stretches the sphincter of Oddi so that tearing of its smooth muscle fibers takes place. Hemorrhages occur in the spincter ring and it invariably contracts in a short time causing further trouble and spasm. Healing after such wide dilatation usually takes place by cicatricial contraction. In two of my patients the cicatricial contraction which followed caused obstruction and jaundice. A second operation on one patient (transduodenal sphincterotomy of Oddi and prolonged biliary catheter drainage) had to be carried out. In another patient, two years later, a supraduodenal endocholdochus section of the sphincter of Oddi promptly cured the patient.

PHARMACODYNAMICS

Drugs which at one time were thought to relax, but later were found to cause, spasm of the smooth muscle sphincter are morphine, pilocarpine, etc. Both morphine and pantopon produce spasm of the sphincter duodenal mechanism. Drugs that temporarily relax the sphincter of Oddi are magnesium sulphate, atropine, sodium sulphate, magnesium oxide, nitroglycerine and nitrates. All treatment to date, however, with drugs has had little success in curing cholecystic disease.

OPERATIONS OF THE BILIARY TRACT

In 1630, Zambecarri was the first to remove the gallbladder. The operation was performed on a dog with success. As early as 1667, Entmüller stated that no medicine would dissolve or cure gallstones. His experiments on the dog proved that the removal of the gallbladder had no deleterious effect on the passing of bile into the bowel. He paved the way by these experiments for the operations of cholecystostomy and cholecystectomy. Cholecystostomy was first performed on a human in 1687 by Van der Weil, and again 51 years later in France (1738) by Amyaudi; in 1742 by Müller and in 1743 by Jean Louis Petit. The latter surgeon and others of his day cut through the skin of the abdominal wall down to the peritoneum to try to make the gallbladder adherent to it with plasters which consisted of onion, horseradish and cantharides. In 1859, Thudichum performed cholecystostomy in two stages, first suturing the gallbladder to the abdominal wall and later opening it. In 1868, Bobbs was the first American surgeon to do a cholecystostomy. Ten years later, in 1878, Simms performed a cholecystostomy on a patient with dropsy. In 1882, Langenbuck, a German surgeon, performed the first colecystectomy. In 1885, Courvoiser and Theiriar, of France, did their first cholecystostomy. Ohage was the first in America. The first cholecystectomy was not done in England until 1894 because of the strong opposition of Tait. In 1887, Movastyrski did a cholecystojejunostomy. Reidel, in 1888, devised, and Sprengel, in

1891, was the first surgeon to perform successfully, a choledochoenterostomy (choledochduodenostomy). Corzi, an Italian, after many experiments on dogs, succeeded in doing a cholecystoduodenostomy. In 1892, Von Vinviarter, of Germany, did a cholecystenterostomy (cholecystocolostomy). In the same year (1892), Gersuny did the first cholecystogastrostomy.

In 1885, Kümmel tried, and in 1889, Thornton performed, a supra-duodenal choledochotomy. Kocher, of Bern, in 1894, was the first surgeon to perform a transduodenal choledochotomy. Von Vinviarter was the first surgeon to perform a choledochotomy. He was followed by Helfreich, Syffert and Ashfeld. In 1909, Wolff did a cholecysto-choledochostomy. In 1935, this operation was revised by Pribram, who did 11 cases.

From 1900 to 1910, several French surgeons tried to overcome the external loss of bile which took place when cholecystostomy or cholecystectomy was performed. They tried to establish internal biliary drainage by inserting a rubber catheter into the common bile duct through a supraduodenal or a transduodenal choledochotomy approach. The catheter left in the common bile duct protruded well into the duodenum through the sphincter of Oddi. This procedure was abandoned because of the numerous complications that followed, notably, that the catheter became obstructed, causing persistent pain and necessitating removal. Some of these indwelling catheters even eroded their way into the peritoneal cavity, causing peritonitis and death. Babcock, in 1920, did a cholecystogastrostomy for the treatment of gastric ulcers. Borgas, in 1925, in Europe, advocated the same operation and this became known as the "Borgas technic." DeBois, in 1931, advocated a cholecystogastrostomy not only as a side-tracking operation, but as an internal biliary drainage operation.

In 1910, Bakes, of Budapest, while doing a cholecystectomy, began dilating the sphincter of Oddi through a supraduodenal approach, first with forceps and later with olive-tipped instruments of his own design. Many surgeons since then have carried out this procedure. They fixed a catheter or "T" tube in the common bile duct for external drainage of bile. Two small catheters, one being inserted upward toward the liver and the other downward toward the duodenum, afford both drainage and a means of administering glucose solution to the duodenum. Later these tubes can be joined so that the bile can be turned back into the intestine. But with the technic of sectioning the sphincter of Oddi through a supraduodenal endocholedochal approach, thereby providing permanent internal biliary and pancreatic drainage, the above procedures are not necessary.

SECTIONING OF THE SPHINCTER OF ODDI THROUGH A SUPRADUODENAL COMMON BILE DUCT APPROACH

In 1933, the surgical technic of an endocholedochus section of the sphincter of Oddi through a supraduodenal choledochotomy was developed and made possible by the specially designed surgical instrument devised by the author, the principle of which was first discovered by Gross, of Philadelphia, that of hiding a knife in a bulb. I performed my first endocholedochus section of the sphincter of Oddi through a supraduodenal approach at that time (1933). This was at least three years before Colp, Doubilet and Gerber of Mount Sinai Hospital, New York, published their brilliant experimental work on dogs *(Arch. Surg., October, 1936)*. In a private communication from Colp (May 20, 1937), he wrote that they had up to that time used their retrograde cutting sphincterotome on only two patients.

We actually drain the bile and pancreatic juice into the duodenum with this technic of endocholedochus section of the sphincter of Oddi. The choledochus opening is closed with fine interrupted chromic catgut sutures and a penrose drain is left *in situ* down to Morrison's pouch.

Archibald, of McGill University, believes that a permanent patulous outlet is provided for the free flow of bile and pancreatic juice into the duodenum by this technic. This is where nature intended these digestive fluids to go at all times. By this operative procedure we have attempted to restore the free flow of bile and pancreatic juice into the duodenum.

Archibald presented a paper *(Meeting of the British Medical Association in Belfast, July 22, 1937)* on the section of the sphincter of Oddi for the relief of pain following cholecystectomy and recurring pancreatitis without stones, and also for sub-acute cholangitis. He said, following Opie's demonstration in 1901, that a direct passage of bile into the pancreas, because of an impacted stone in the ampulla of Vater, produced pancreatitis. He also assumed that because of the large number of cases of acute and chronic pancreatitis, which was not associated with stones, the same theory of retrojection of bile into the duct of Wirsung might hold. In such cases the obstruction was due to the spasm of the sphincter of Oddi. Later he realized that mere distention of the common bile duct and gallbladder by prolonged spasm of the sphincter could cause pain. Where attacks of pain occurred after removal of the gallbladder without signs of organic cause they would be explained by too rapid distention of the common bile duct which was unable to take up back pressure without the help of the gallbladder. Where signs or the suspicion of organic cause were not in question, he advised medical treatment first, consisting of frequent feedings to keep the sphincter relaxed, and then the prescription of bile salt tablets. If this failed, operation was indicated. At operation search should be made for organic causes; none being found, the procedure should be section of the sphincter of Oddi. "With a free outlet for bile and pancreatic juice," he believes, "ascending infection is a negligible factor. This only occurs when infection enters the ampulla of Vater and is held there behind the tightly closed door of the spastic sphincter of Oddi. With a patulous sphincter, free drainage takes care of ascending and retrograde infection."

TECHNIC OF AUTHOR'S OPERATION

The anesthetic is selected according to the case. Under spinal anesthesia we have found the sphincter of Oddi usually relaxed, and under general anesthesia it was closed in a spasm. A few centimeters of novocain run down the common duct will relax the sphincter so that a small probe, or the two millimeter beak, or the sphincterotome will readily pass the papilla duodeni.

After the common bile duct is exposed in its supraduodenal portion, two fine ligatures are inserted into the common bile duct. If bile has not been seen to exude from these suture wounds in the duct, aspiration will soon reveal if the bile duct, the hepatic artery, portal vein or some other viscus has been entered. Having identified the common bile duct, a small incision about 1 cm. in length is made in it between the two ligatures. A suction tube carries off the outflowing bile and pancreatic juice and the previously placed moist gauze pads in the deeper portion of this wound collects the remainder.

A semi-flexible probe is passed into first the hepatic and then the common duct to palpate for stones which could

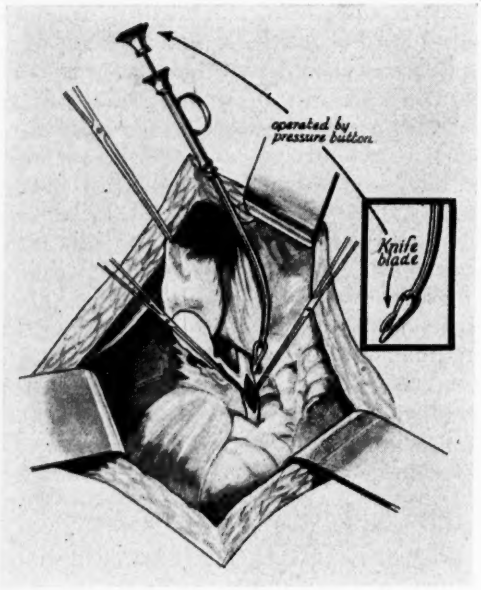


Fig. 1. De Muth sphincterotome shown ready to enter common bile duct supraduodenally.

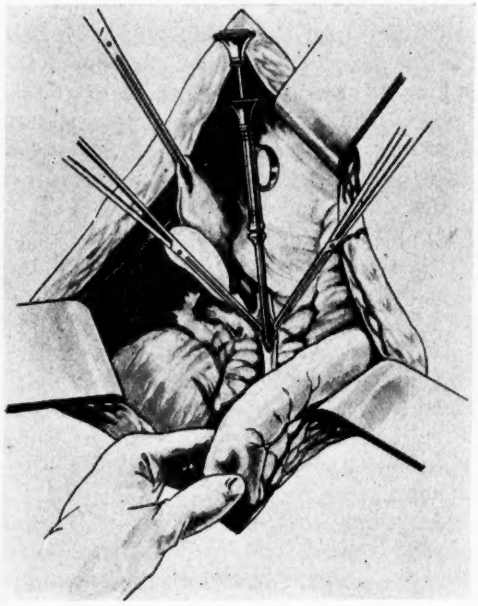


Fig. 2. Sphincterotome has been passed down the common bile duct. The 2 mm. beak has passed through the papilla duodeni and is felt and seen bulging the anterior duodenal wall.

or could not be felt with a finger in the foramen of Winslow. The patency of the ampulla of Vater is next determined. A small catheter (size 12) attached to a long beaked syringe is next inserted and the duct is thoroughly washed out with warm saline solution. Small stones and debris will readily flow out, but many are so embedded in its wall that only a scoop or forceps can dislodge them. This must be done gently lest the wall be perforated. The bile passages are cleaned of as many stones as possible. No doubt many small stones remain and are held fast in the ulcerated columnar epithelial lining of the duct. It is these minute stones which are so often missed and will later become larger, causing the post-operative symptoms of common duct pathology.

The sphincterotome is now gently passed through the supraduodenal choledochotomy opening and down the common duct (Fig. 1). It is gently manipulated until the 2 mm. beak is felt easily by pressing the anterior duodenal wall over it (Fig. 2). This anterior duodenal wall is allowed to come away from the point of the instrument (Fig. 3). The button controlling the knife is pressed home next, as the instrument is advanced slightly downward. This maneuver sends out the concealed knife in the olive bulb, severing the sphincter of Vater. The button is immediately released and the bulb of the instrument can be passed freely to and fro into the duodenum (Fig. 4).

The instrument is now withdrawn and the catheter attached to the syringe is inserted into the duodenum (Fig 5). A syringefull or two of warm saline solution is run into the duodenum and withdrawn to ascertain if any bleeding has

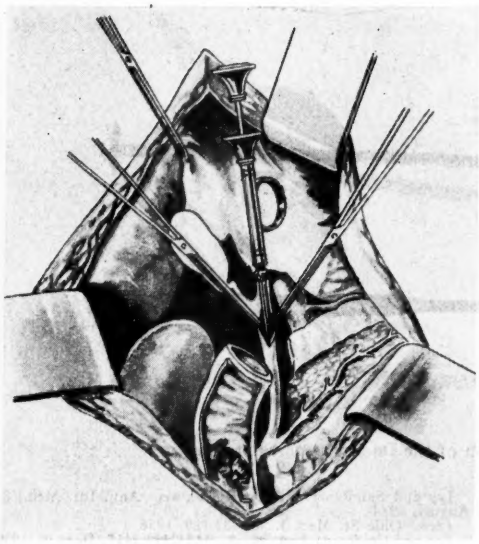


Fig. 3. An open section of the second portion of the duodenum, showing the point of the sphincterotome entering the papilla duodeni.

taken place. The small catheter is then withdrawn until about 1 in. is left in the common bile duct. It can be fixed there by a suture and the choledochotomy opening closed snugly around it. This catheter can thus be used for external drainage until such time as the surgeon's experience will permit him to close, without anxiety, the common bile duct. A Penrose drain is always left down to the depth of the renal fossa. This takes care of any seepage or infection which might occur.

If the sphincter of Oddi has really been sectioned and the common bile duct not unduly traumatized, the small catheter left in permits the bile to flow freely around it into the duodenum. Thus very little bile and no pancreatic juice will drain externally.

AUTHOR'S SPHINCTEROTOME

This instrument consists of several parts, a brass olive-shaped bulb, a flexible copper shaft, brass hypo-syringe

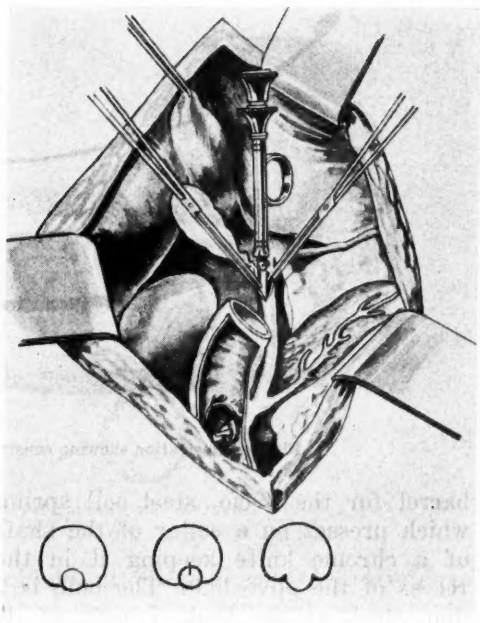


Fig. 4. The button has been pressed home, and the knife, which was hidden in the olive tip, has emerged and sectioned the sphincter of Oddi.

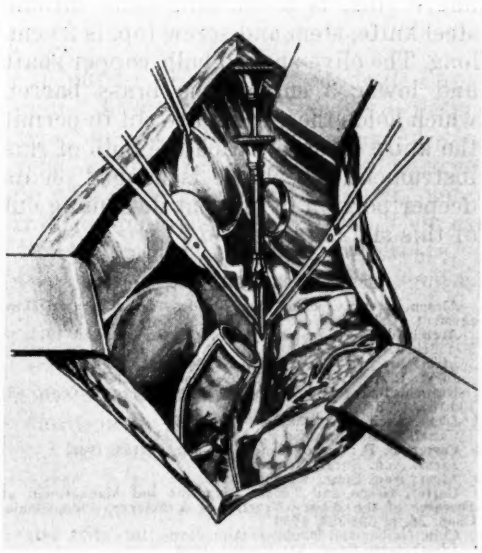


Fig. 5. The knife is back in its olive bulb and the bulb is in the duodenum.

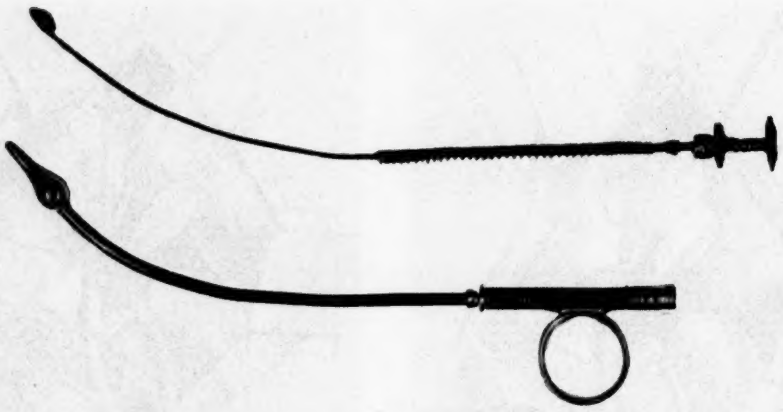


Fig. 6. Illustration showing construction of the De Muth sphincterotome.

barrel for the 8 cm. steel coil spring which presses on a collar of the shaft of a chrome knife keeping it in the recess of the olive bulb. The bulb is 2 mm. thick at the beak, 7 mm. at its widest part, and 2½ cm. long. The copper shaft is 15 cm. long and ½ cm. wide. The brass barrel, with its perforated screw top, to whose side is attached the finger ring, is 6 cm. long. The chrome steel knife, stem and screw top, is 25 cm. long. The olive-shaped bulb, copper shaft and lower 3 cm. of the brass barrel, which holds the spring, are slit to permit the knife blade to reach the bulb of this instrument. The knife is flanged on its deeper portion to prevent its coming out of this slit (Figs. 6 and 7).

BIBLIOGRAPHY

Alesen, L. A.: Common Duct Lesions: Their Surgical Management. Calif. & Western Med., 55: November, 1941
Archibald, E.: Canadian J. Med. & Surg., April 1913, p. 5-7; February, 1913, p. 10
Idem: Internat. Cong. Med., London, 1913, p. 27
Idem: J. A. M. A., 71: 798-799, Sept. 7, 1918
Branch, Bailey and Zollinger: Surg., Gynec. & Obst., 66: 100-104, 1938
Idem: Arch. Surg., 38: 358-371, 1939
Cattel, R. B.: Ann. Surg., 32:899, 1929
Carter, F. D.: Surg., Gynec. & Obst., 63:163, 1936.
Idem: Ann. Surg., October, 1921
Idem: Ann. Surg., October, 1936
Carter, Green and Twiss: Diagnosis and Management of Diseases of the Biliary Tract. Lea & Febiger, Philadelphia, Chap. 26, p. 305-308, 1939
Colp, Gerber and Doubilet: Ann. Surg., 103: 67-75, 1936
Idem: Arch. Surg., 33: 369-707, 1936
Idem: Arch. Surg., January, 1937
Doubilet and Colp: Surg., Gynec. & Obst., 64:622-23, 1937
Goldman and Bell: J. A. M. A., 117: 1582-85, Nov. 8, 1941
Ivy, A. C.: Post-grad. Med. Assemb., February, 1937
Ivy and Bergh: J. A. M. A., 103:1500-04, Nov. 17, 1934
Ivy and Sandblom: Biliary Dyskinesia. Ann. Int. Med., 8: August, 1934
Idem: Ohio St. Med. J., 32:185-189, 1936
Ivy and Goldman: J. A. M. A., 113:2413-2417, Dec. 30, 1939
Jackson, R. H.: Ann. Surg., October, 1923
Judd, E. S., McIndoe and Marshall: Practice of Surgery. Dean Lewis, Chap. 2, vol. 7, 1929
Lahey, F. H.: Ann. Surg., 98: p. 644-49
Idem: Ann. Surg., 105: May, 1937
Spivack, J. L.: Surgical Technique of Abdominal Operations, Chap. 20, Sec. 7, p. 496-501
Thorek, M.: Trans. Internat. Coll. Surg., 1: 173-184, 1928
Idem: Ill. Med. J., 64:425, 1933
Idem: Surgical Errors and Safeguards, J. B. Lippincott & Co., Philadelphia, 1934
Idem: Am. J. Surg., 30:389, 1935
Idem: Modern Surgical Technic, J. B. Lippincott & Co., Philadelphia, vol. 3, 1938
Walters, Snell and Saunders: Diseases of the Gallbladder and Bile ducts, Chap. 4, p. 419-443, 1940
Zollinger and Cutler: Atlas of Surgical Operations, p. 78

SUMMARY

A study of the anatomy, physiology and pathology of the biliary and duodenal-pancreatic sphincter mechanism has been presented. It has been shown that normal digestion cannot take place in patients suffering from chlocystic disease. This is due to the fact that bile and pancreatic juice cannot enter the duodenum at the proper time or in sufficient amounts, due to a spasm of the sphincter of Oddi.

This spasm has been shown to persist after cholecystectomy, cholecystostomy and cholecystectomy supplemented by a dilatation of the sphincter of Oddi, also in patients suffering from biliary dyskinesia. Surgical technic—a supraduodenal endocholedochus section of the sphincter of Oddi, has been devised and made pos-

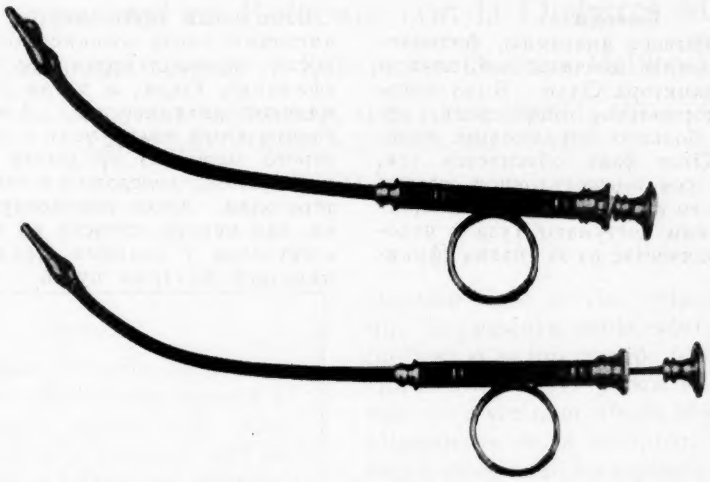


Fig. 7. Sphincterotome showing blade exposed (above), and retracted (below).

sible by a specially designed instrument. A technic is submitted to be used as a primary procedure in all patients with cholecystic disease and biliary dyskinesia, whose symptoms are such as to require operative relief.

SUMARIO

Presenta un estudio de la anatomia, fisiologia y patologia del mecanismo esfintero-duodenal que rige el paso de las secreciones biliar y pancreatica. Se demuestra que la digestión no puede verificarse normalmente en los pacientes que sufren de enfermedades de la vesicula. Esto se debe a la imposibilidad de que la bilis y el jugo pancreático penetren en el duodeno al tiempo debido ó en cantidades suficientes a causa del espasmo del esfinter de Oddi.

Este espasmo, se ha demostrado que persiste, despues de la colecistostomia, colecistectomia o colecistectomia con dilatación del esfinter de Oddi; asi mismo ên pacientes que padecen de disquinesia biliar (espasmo funcional). Se hace posible por medio de un neuvo procedimiento quirurgico con un instrumento hecho especialmente para este objeto, practicar el corte del esfinter de Oddi por la via endocolédoca. Se ofrece este procedimiento para su empleo como medida primaria en todos los casos de colecistectomias y disquinecia biliar cuyos sintomas requieren una intervención quirurgica para aliviarse.

RÉSUMÉ

L'auteur présente une étude de l'anatomie, de la physiologie et de la pathologie du mécanisme du sphincter duodénal et biliaire. La digestion normale ne s'effectue pas chez les sujets souffrant de maladie cholecystique. Cela est dû à ce que la bile et le suc pancreátique ne se déversent pas dans le duodéum en quantité suffisante et en temps opportun, vu le spasm do sphincter d'Oddi. Ce spasme persiste après la cholécystostomie et après la cholécystectomie avec dilatation du sphincter d'Oddi, et aussi, chez les malades souffrant de dyskinesie bilaire. L'auteur soumet une technique à être employée comme premier stage dans toutes les cholecystectomies et chez tous les malades souffrant, de dyskinésie biliare dont les symptômes nécessitent une intervention chirurgicale.

Выводы

Автор описывает анатомию, физиологию и патологию желчных протоков и динамизм сфинктора Одди. Было показанно, что нормальное нищеварение невозможно у больных страдающих холециститом. Этот факт обясняется тем, что желчь и сок поджелудочной железы не попадают во время в двенадцатиперстную кишку или поступают туда в недостаточном количестве из за спазма сфинктора Одди.

Этот спазм продолжается после холецистомии, после холецистектомии и даже после холецистектомии с дилотацией сфинктора Одди; а также у больных с желчной дискинеезией. Авоор изобрел специальный инструмент с помощью которого возможно проделять супрадуоденальную ендохоледоковую секцию сфинктора одди. Автор рекомендует этот прием, как первую ступень во всех холецистектомиях у больных страдающих дискинезией желчных путей.

INTERNATIONAL COLLEGE OF SURGEONS

For information concerning membership, write to Mr. Ralph Osborne, *Business Secretary,* International College of Surgeons, 1512 Spruce Street, Philadelphia, Pa.

Cirugia Suparenal en Relacion con la Diabetes Mellitus*

(Suprarenal Surgery in Relation to Diabetes Mellitus)

MANUEL A. MANZANILLA, M.D., F.I.C.S. (HON.)., AND
FRANCISCO FONSECA GARCIA, M.D., F.I.C.S.

MEXICO, D. F.

SUMMARY

The authors describe their experiences and physiologic aspects of hyperglycemia produced by puncture of the fourth ventricle and the results obtained from an interruption of the splanchnic nerves and denervation of the suprarenal capsules, with particular reference to diabetes. The technic is described.

ENTRE las diversas modificaciones inmediatas que suceden a la resección de los nervios esplácnicos, citaremos con referencia a este estudio, la disminución de la glicemia.

Es bien conocido el clásico experimento de Claude Bernard, determinando hiperglicemia y glicosuria por la picadura del cuarto ventrículo. Kalm, Blum, Eppinger, Erlandsen, Falta, Herzberg, Richards, Ruddinger y Vosburgh han demostrado que se trata de un reflejo adrenalinosecretor, puesto que inyectando adrenalina en la circulación se produce hiperglicemia, y con la ligadura de las venas suprarrenales se observa hipoglicemia.

Kalm, Mayer y Tschosaroff han demostrado asimismo que el reflejo en cuestión sigue la vía esplácnica, puesto que la picadura ventricular permanece ineficaz si se interrumpe previamente la citada vía. Geiger y Szirtes han observado a su vez aumento de la acción hipoglicemiante de la atropina, después de haber seccionado los esplácnicos, presentando así la contraprueba farmacológica.

Boggicco, David, Frouin, Mayer y Zuelzer, experimentando la ligadura de las venas suprarrenales en animales despancreatizados, concluveron que la enervación bilateral suprarrenal produce acción hipoglicemiante, que ordinariamente modifica la curva glicémica a partir del tercer día, para volver a cifras normales después de algunas semanas. Ciminata instituyó por vez primera la investigación sistemática sobre las modificaciones de la glicemia, consecutivas a la enervación suprarrenal, experimentando en animales de laboratorio hiperglicémicos por excitación farádica del ciático, los que después de enervación bilateral en tiempos sucesivos, sobrevivieron largo tiempo presentando disminución de la hiperglicemia provocada. Takats demostró posteriormente un notable aumento a la tolerancia de los hidratos de carbono, practicando la enervación suprarrenal bilateral o la enervación unilateral con resección esplácnica con capsulectomía contralateral; Takats observó que dicha tolerancia alcanzaba su máximo a los seis meses y persistía aun después de un año, atri-

* Presented at the Third International Assembly of the International College of Surgeons held in Mexico City, August, 1941.

buyéndola a repercusión circulatoria vasodilatadora en los islotes de Langerhans. Cesa Bianchi y Moretti demostraron a continuación, que puede reducirse notablemente el índice en algunos diabéticos, utilizando la ergotamina para atenuar o inhibir la inervación simpática, que constituye en realidad el complejo neurohormonal antagónico de la insulina.

Manzanilla y Fonseca, empleando recientemente en el hombre el bloqueo esplácnico por alcoholización, han observado un notable e inmediato descenso de la glicemia, que al quinto día puede alcanzar cifras superiores hasta un setenta y cinco por ciento a las encontradas antes del bloqueo, persistiendo el descenso del índice glicémico hasta por dos semanas.

Asi pues, la sección simpática, anatómica o funcional, en relación con la inervación suprarrenal, da por resultado: a) ruptura del equilibrio vagopancreático-suprarrenoesplácnico, con hipoglicemia; b) hipoglicemia notable y duradera por hipoadrenalinemia; c) en animales diabéticos por despancreatización, desaparición frecuente de la glicosuria y en todo caso mayor tolerancia a los hidratos de carbono.

APLICACION TERAPEUTICA

Las investigaciones originales de Pende con fines a la limitación del funcionalismo suprarrenal, obtenida por la resección de los esplácnicos y la extirpación de los ganglios semilunares, dieron históricamente orígen a la enervación del plexo nervioso pericapsular suprarrenal, ideada experimentalmente por Ciminata y ejecutada quirúrgicamente por Donati, para reducir la hiperglicemia en la diabetes. Crile ha empleado asimismo la enervación suprarrenal en algunas formas de hipertiroidismo exoftálmico, úlceras pépticas gastroduodenales quirúrgicamente rebeldes, endarteritis obliterante juvenil, síndromes asténicos neurocirculatorios, epilepsía esencial e hipertensión maligna, pero la diabetes constituye la más clara indicación.

Dentro de lo consignado, se destaca la importancia que para la terapéutica de la diabetes pancreática tiene la sección simpática por enervación suprarrenal, dado que, reduciendo la hiperglicemia por disminución adrenalínica, tiende a equilibrar la insuficiencia pancreática existente con las benéficas modificaciones consiguientes en el trastornado metabolismo de los hidratos de carbono. Se hace caso omiso en esta ocasión de las diversas y sensibles modificaciones, funcionales e histológicas, inherentes a la estructura neurosimpática, modificaciones vasomotoras, motoras, secretoras, sensoriales y tróficas.

TECNICA OPERATORIA

Antes de proceder a su ejecución en el vivo, hemos practicado en el cadáver un gran número de veces diversas técnicas dirigidas hacia la enervación pericapsular suprarrenal, estudiando además la operación de Crile para la interrupción de la vía simpática por la ganglionectomía celíaca y enervación del plexo aórtico. En virtud de su sencillez y facilidad de ejecución, no obstante los naturales escollos de este tipo de intervención quirúrgica, recomendamos la técnica de la enervación yuxtaglandular suprarrenal descrita por Donati, que hemos resuelto emplear sistemáticamente con las modificaciones de detalle, derivadas de nuestra experiencia y en relación con las circunstancias de cada caso en particular.

RESULTADOS

Nuestra experiencia personal sobre este prometedor recurso brindado por la terapéutica quirúrgica no lo consideramos aun lo suficientemente amplio para sentar definitivamente conclusiones de-

rivadas de nuestro criterio a este respecto. Sin embargo, nuestra limitada experiencia sobre el particular, encaja dentro de los satisfactorios resultados obtenidos por la experiencia derivada de los casos referidos por cirujanos, que de esta acción terapéutica se han ocupado con positivo interés, y entre los cuales citaremos el caso clásico de Donati, el de Corachan y Cimarro, los tres muy interesantes de Giordano, y la importante estadística de sesenta intervenciones de Crile, en las que en ocasiones la enervación suprarrenal fué completada con la resección de los esplácnicos (Crile), obteniéndose un noventa por ciento de resultados buenos en los operados.

RÉSUMÉ

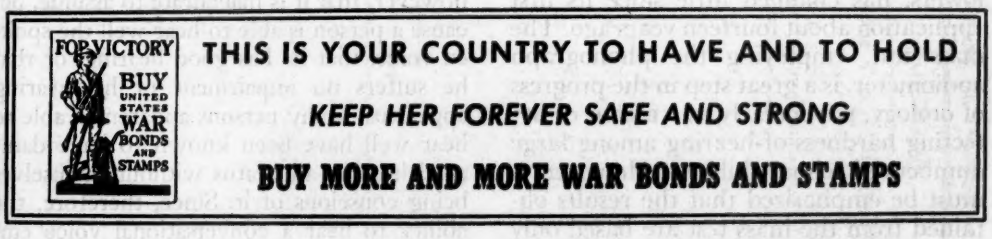
Les auteurs mentionnent les experiences de physiologie sur la piqûre du quatrième ventricule, qui produit une hyperglicemie, laquelle est empechée par la section de la voie splachnique ou par la dénervation des suprarénales. En consequence, ils pratiquent la dénervation suprarénale dans le diabète. La technique est presentée.

SUMARIO

Los autores mencionan las experiencias de fisiología en las cuales la picadura del cuarto ventrículo produce hiperglicemia, lo cual es impedido por la interrupción de la vía esplácnica o denervacion de las suprarenales. En consecuencia, hacen la denervacion de las suprarenales en la diábetes. La técnica es presentada.

Выводы

Авторы описывают физиологическия характеристики гипергликемии произведенной пункцией четвертого желудочка и перерыва утробных нервов и денервации супраренальной капсюли, в особенности в отношении к сахарной болезни. Авторы описывают технику.



Individual Audiograms *versus* Mass-Testing as a Means of Detecting the Hard-of-Hearing*

SOL MALIS, M.D.
LOS ANGELES, CALIFORNIA

SIGNIFICANT findings on the high percentage of hearing difficulties and other interesting data, discovered in a survey of hearing among children in Los Angeles parochial schools, form the basis of this report. These facts may not only alter our concept as to what constitutes hard-of-hearing cases, but may stimulate us to greater interest in and action for their prevention, and may give us a clue as to the underlying causes for hardness-of-hearing in the adult. It may also support that school of thought which claims that undetected hard-of-hearing in the young is a causative factor in the adult.

Since the advent of the audiometer, surveys of hearing among school children have been made in most of the big cities. The method employed by the pioneers in this field, Fowler, Newhart and their followers, has changed little since its first application about fourteen years ago. The mass test, employing the phonograph audiometer, is a great step in the progress of otology, particularly as a means of detecting hardness-of-hearing among large numbers of school children. However, it must be emphasized that the results obtained from the mass test are based only on the range of the conversational voice. On this basis the incidence of hearing defectives, as reported by investigators over the past fourteen years, varies from 6 to 9 per cent. In contrast, the incidence found by the individual pure-tone audiometer test herein described is more than twice that figure.

The marked discrepancy of these incidences, as I shall point out, may be attributed to the fact that high tones were not considered in the mass test, nor were the children in the lower grades, grade 3 and under, included because of the greater intelligibility that that test requires.

DEFINITION

One may ask what constitutes hardness-of-hearing. As defined by some investigators, it is any hearing loss in the range of the conversational voice, since it is the conversational voice that is most needed to carry on everyday life. We know now, however, that it is inaccurate to assume, because a person is able to hear well the spoken voice, that he has good hearing, or that he suffers no impairment of his hearing apparatus. Many persons apparently able to hear well have been known to have damaged hearing apparatus without themselves being conscious of it. Since, therefore, the ability to hear a conversational voice embraces the lower and middle registers but does not include the high tones, is it correct to accept it as an index of hearing acuity?

Would it not be more correct to define hardness-of-hearing as constituting any de-

*A survey of hearing in the Los Angeles parochial schools.

TABLE I.—SURVEY OF HEARING IN THE LOS ANGELES PAROCHIAL SCHOOLS BY MEANS OF INDIVIDUAL AUDIOGRAMS

School	Total No. of Children Examined	Hard-of-Hearing		SEVERE								MODERATE								Borderline
				Low Tone		Middle Tone		Mixed Tone		High Tone		Low Tone		Middle Tone		Mixed Tone		High Tone		
		No.	%	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	Uni-lateral	Bi-lateral	
A	402	80	20	..	..	..	..	3	2	17	23	2	2	..	..	..	..	15	7	9
B	131	25	19	..	..	..	3	..	..	..	2	..	..	..	..	2	2	6	6	4
C	297	62	20.8	3	..	2	..	2	2	7	5	2	1	3	5	3	8	5	2	12
D	218	39	18	..	..	..	..	1	3	1	5	..	2	..	..	3	2	6	3	13
E	652	137	21	..	..	..	..	7	8	15	10	6	3	..	..	21	17	26	28	6
F	463	96	20.7	1	..	..	..	3	11	14	17	4	1	..	..	5	14	8	17	1
G	277	70	25	..	..	..	..	2	7	6	14	1	2	2	..	9	4	5	10	8
H	127	32	25	..	..	..	..	7	6	..	..	..	..	..	..	..	..	7	12	0
Total	2,567	541	21							60	76							78	85	53

Total hard-of-hearing cases.....541

Borderline cases..... 53 (10% of total hard-of-hearing cases)

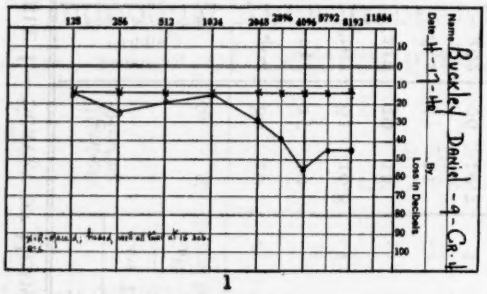
Incidence of hard-of-hearing cases..... 21.0%

Minus 10% borderline cases..... 2.1%

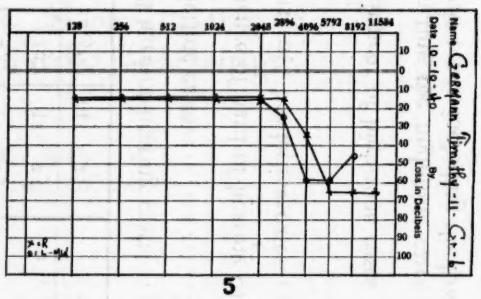
18.9%

Impairment of high-tone cases (60, 76, 78, 85)=299, or 55.45% of total hard-of-hearing cases.

Deducting the high-tone cases from the total incidence (55.45 of 18.9% = 10.48); 18.9—10.48 = 8.52%, representing the low tones, including the low grades.


128 256 512 1024 2048 2896 4096 5792 8192 11584
10 0 10 20 30 40 50 60 70 80 90 100
Loss in Decibels

1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Loss in Decibels

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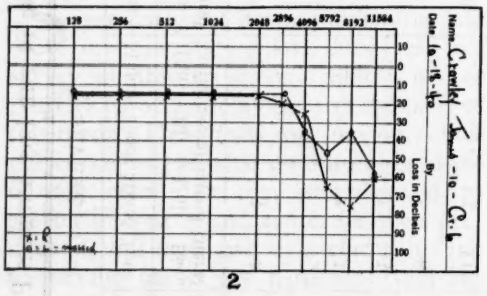
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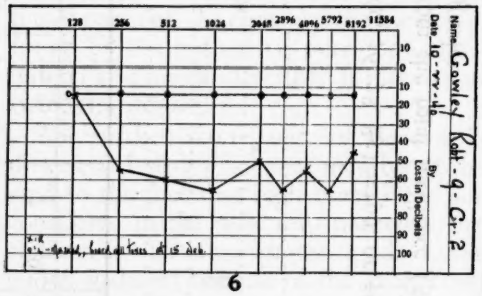
Loss in Decibels

2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Loss in Decibels

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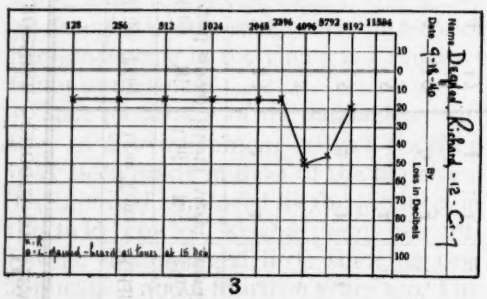
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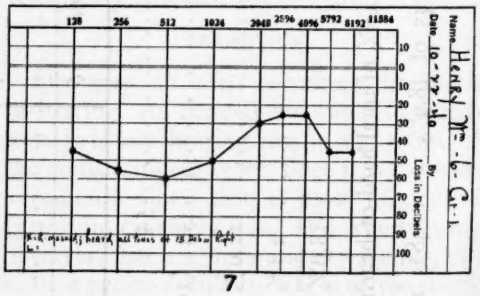
Loss in Decibels

3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Loss in Decibels

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128 256 512 1024 2048 2896 4096 5792 8192 11584
10 0 10 20 30 40 50 60 70 80 90 100
Loss in Decibels

4

128 256 512 1024 2048 2896 4096 5792 8192 11584
10 0 10 20 30 40 50 60 70 80 90 100
Loss in Decibels

8

viation below normal in any part of the scale, whether it be low, middle or high tones?

TESTING PROCEDURE

Of the 26,000 children assigned for our investigation 2,567 were tested individually. The age range was from 5 to 16 years, from kindergarten to high school. I shall report the results found in eight schools, four schools where the children were foreign-born and poor and four schools where the great majority were from well-to-do native American homes.

The Maico audiometer was used throughout, and a threshold of 10-15 decibels was established in every school to offset the surrounding noises. Before each examination, all the frequencies of the audiometer were first tested by the examiner, who was able to hear them at zero or a little above zero. Where the examiner could hear distinctly all the frequencies at zero, the threshold was adjusted to 10 db., and when in doubt to 15 db.

Each child was tested for all frequencies, from 128-8,192 cycles, at the established threshold intensity. No case was considered as impaired hearing if the intensity had to be increased only 5 db. above the threshold, unless other tones were involved at a greater intensity. Similarly, single tonal gaps, no matter at what intensity, unilaterally or bilaterally, were disregarded. For example, there were many cases that heard all tones at 15 db. but could not hear the 2,896 at 25 or 30 db. bilaterally. There were others that heard all tones at 15 db. but could not hear the 4,096 frequency at 30 or 40 db., unilaterally or bilaterally. These cases were not considered as hard-of-hearing.

Why some cases should have impairment of hearing for certain isolated tones, I do not know. The failure is probably due to some defect in the basal part of the cochlea, as pointed out by Crowe and his co-workers. If this should be a sign of beginning cochlear damage, it would be interesting to check these cases at a later date and note whether those tones found affected in the previous test show progressive damage, and whether there is impairment of additional tones.

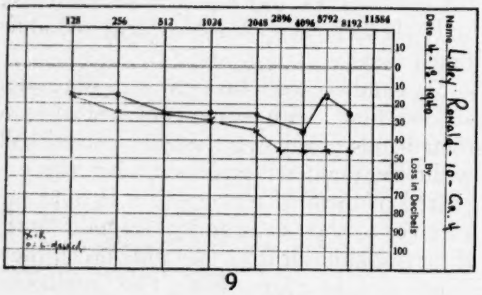
Six children were brought into the room at one time, with completed histories in their hands. They were asked to stand still while the examiner explained what was expected of them; that they were to hold the receiver to their ears, and to respond "yes" if they could hear the tones and "no" if they could not hear anything. The intelligent examiner, being on the alert and with the "interrupter" at his command, could tell in the great majority of cases whether the responses were reliable or not.

In this manner, and with proper and efficient help for filling out the case histories, we found that we could test from 30 to 40 children in one hour. With no interruption we could secure from 80 to 100 audiograms, with retests, in the morning, especially of children in the higher grades.

The histories were obtained directly from the child and compared with the principal's record at school. After the children of each school were tested, the cases were classified, and the principal of the school notified of those children found to be hard-of-hearing. A request was sent to the parent by the school to have the child examined by a competent otologist.

CLASSIFICATION OF CASES

The cases were classified according to the degree of decibel loss (see Table I). Those having a loss of 10-15 db. above the established threshold in two or more successive tones were grouped under "moderate;" those with a loss of 15 db. and over, above the established threshold and in successive frequencies, were classified as "severe." The cases were then reclassified under "low tones" when the lower frequencies were involved; and under "high tones" when the frequencies from 2,048 and up were impaired. Those who showed impair-



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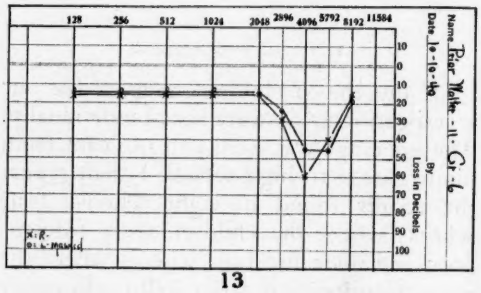

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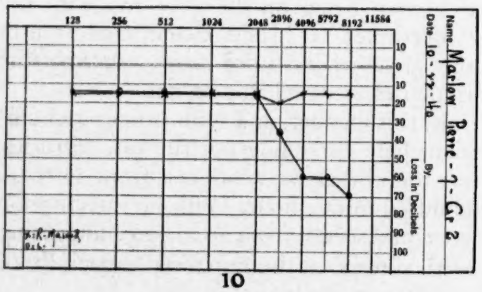

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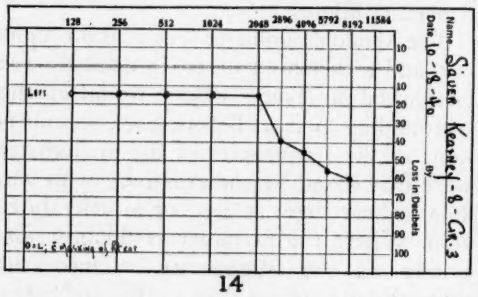

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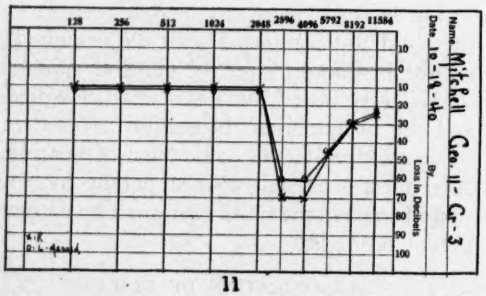

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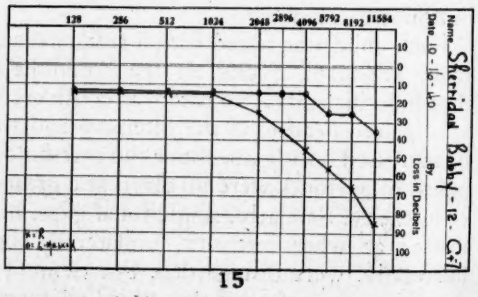

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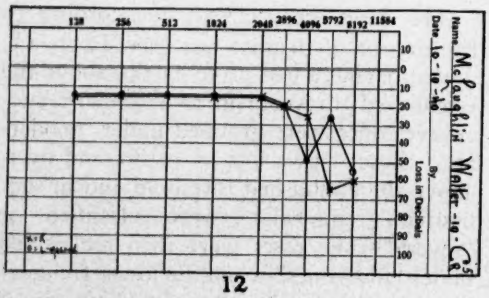

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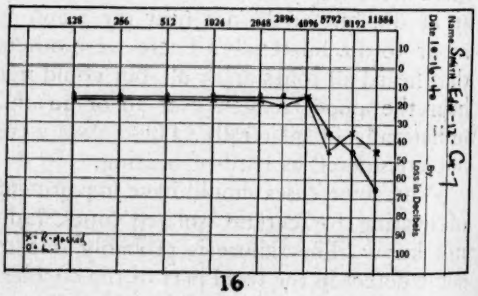

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ment of both the low tones and the high tones, unilaterally or bilaterally, were grouped under "mixed." There were several cases where the middle tones were affected. Some cases could not be grouped in any of the above classes, and yet they were not within normal limits, and so were considered as "borderline" cases.

Such grouping seems to the writer both practical and scientific. It tells us at once the degree, range and laterality of the child's impairment. No attempt at diagnosis was made. The fact that a child showed a loss of 40-60 db. or more in three, four or more frequencies did not prompt us to draw any definite conclusions. In some of the cases we tested for Schwabach (512DV) and Rinne, and in some cases with unilateral impairment for the Weber test. No attempt to locate the nature or the localization of the lesion was made in this preliminary survey.

FINDINGS OF HISTORIES AND AUDIOGRAMS

A study of the audiograms suggests several interesting questions:

To what extent is the preponderance of intact tonsils in the hard-of-hearing a causative factor?

Is the history of any value? Does a negative history exempt the child from a thorough examination? Should a case with a history of positive symptoms be further scrutinized? For example, of the 80 hard-of-hearing cases in school A, 11 gave histories of deafness in the family. Ten of these had no relatives at school. One whose history reported that her father was deaf, had a brother in the same school who was also hard-of-hearing, discovered not through the history, but through the audiometer. In the 80 cases we found 5 families with 2 children each, and 1 family with 4 children, all hard-of-hearing, with no history of deafness in the family; all were spotted with the audiometer. Among the good-hearing cases in the same school, 30 gave a history of deafness in the family.

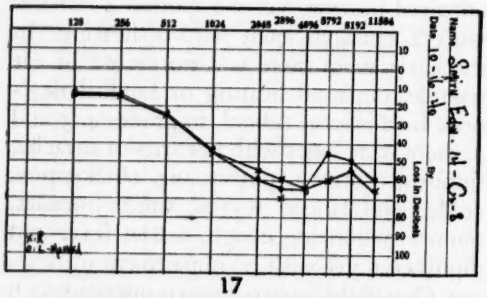
In school B there was no history of deafness in the family among the 25 cases with impaired hearing, yet we spotted 4 families with 2 children each hard-of-hearing. In the latter cases there was no record of ear trouble, impaired hearing or familial deafness. In this same school, in grades 4, 5 and 6, there were cases with histories of earache, tinnitus, otorrhea, pneumonia, chickenpox, colds, ears lanced several times, measles, mumps, whooping cough, scarlet fever and diphtheria, yet with no impairment of hearing. One child reported seven operations on her mastoid, yet her hearing for all tones was good. Among the good hearing cases in the same school there were 8 that gave a history of deafness in the family.

In school D, among the 39 cases with impaired hearing, there were 5 cases, or 12.4 per cent, with family deafness; whereas among the 179 good hearing cases there were 26, or 14.5 per cent, with family deafness.

In school C, whose children were from well-to-do homes, of the 62 cases with impaired hearing, 3 gave histories of deafness in the family, but no relatives were spotted at school. Among these 62 cases, we discovered 4 families, 2 families with 2 children each and 2 families with 3 children each, who were hard-of-hearing, with no history of deafness in their families—all spotted with the audiometer. Among the good-hearing cases there were 4, or 1.7 per cent, with a history of deafness in their families.

One questions what will become of those children who are apparently unaware of their affliction as they grow up. Also will the children with a positive history of deafness in their families, but who have good hearing now, retain their hearing acuity until they reach maturity?

Our findings present another interesting problem, that of otosclerosis. How are we to detect early or incipient otosclerosis among schoolchildren? At what age does this affliction begin to do perceptible dam-



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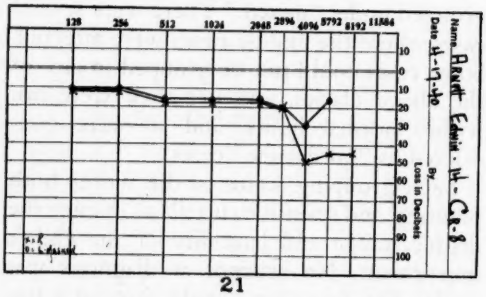

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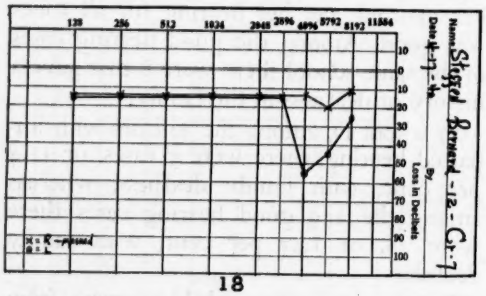

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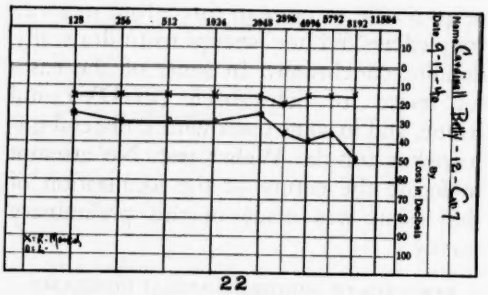

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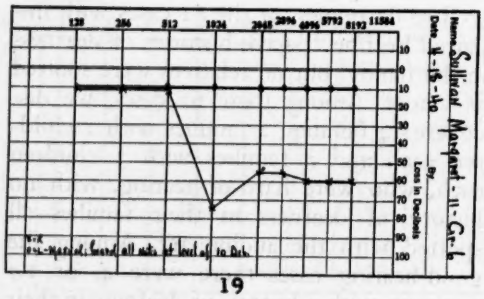

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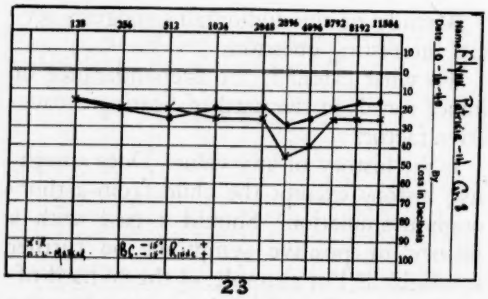

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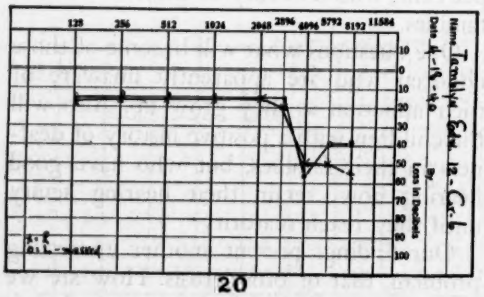

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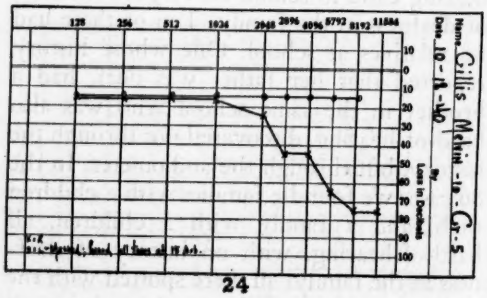

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age within the middle ear? We know families in which both parents and some grandparents are afflicted with hardness-of-hearing, but where the children at an early age hear well all tones. Is this proof that these children will hear well as they grow up? As they reach puberty will they begin to have trouble with their hearing? Then neither the physician's advice nor his therapeutics are of great help. By spotting and following up such cases, as I pointed out, I feel we can do the greatest good in the field of hearing difficulties, particularly in detecting potential otosclerotics. Not only may we retard the progress of the damage, but many cases may be improved if discovered early and treated adequately. As Guggenheim has pointed out, a great deal could be done for the potential otosclerotic if his condition could be diagnosed and treated before he reached the age of thirteen.

Studying the audiograms, one cannot deny that they reveal definite impairment of hearing, whatever the nature or source. What startles one, as we have noticed, is the comparative frequency of the high-tone impairment. This is rarely found in the ordinary mass testing. Therefore, the incidence reported to date, varying from 6 to 9 per cent, is far below that revealed by this survey. If the high-tone impairment were included in the statistics reported by those using the 4A audiometer (later supplanted by the 4B and now by the 4C), the incidence would rise to 15 per cent and over. As will be noted in the table, 55.45 per cent of our cases of impaired hearing are children with high-tone involvement. If these cases are deducted from the total, we arrive at the same incidence as that reported by those using the mass test (phonograph-audiometer); conversely, if these figures are added to the percentages reported by the mass tests, we arrive at the much higher incidence found in this survey.

IMPORTANCE OF HIGH-TONE IMPAIRMENT

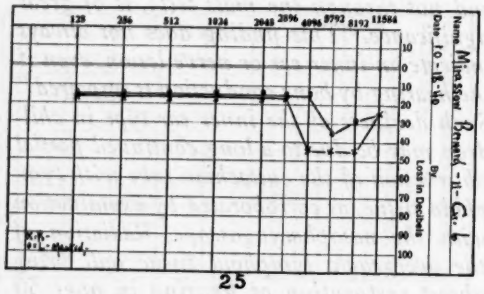
The discovery of high-tone impairment in the course of a survey (and which can be made only with the pure-tone audiometer and not through the mass test), is of great significance. "This finding does not always indicate an inner ear or nerve lesion, even if the hearing by bone conduction is impaired." Such deafness of the inner ear type in children may be due to a long continued partial obstruction of the eustachian tube with lymphoid tissue, as corroborated by examination with the nasopharyngoscope. Radiation of the overgrown lymphoid tissue will bring about restoration of hearing in over 50 per cent of these cases, as pointed out by Crowe and Burman.

ADVANTAGES OF INDIVIDUAL AUDIOMETER TESTING

One may question whether a plan of individual testing with the pure-tone audiometer could be adopted for use in large cities, that is, those having an enrollment of 200,000 children and more. We believe it is feasible and that it could be made possible at a comparatively low cost by using several audiometers at the same time, covering from 3,000 to 5,000 children in a week. The procedure is even simpler in the rural districts, where the total enrollment is from 500 to 5,000.

On the basis of the figures obtained from this preliminary survey, it would seem that if the facts and their significance were brought to the attention of the public at large, the need for a more intensive survey of hearing among school children would be realized. If such a program were adopted and consistently followed through, there would be a tremendous financial saving to taxpayers, to say nothing of the possibility of preventing incipient cases of hearing difficulties from developing if detected early and corrected in time.

The method of testing school children for hardness-of-hearing herein described is simple of operation, practical and accurate and is as speedy and less costly



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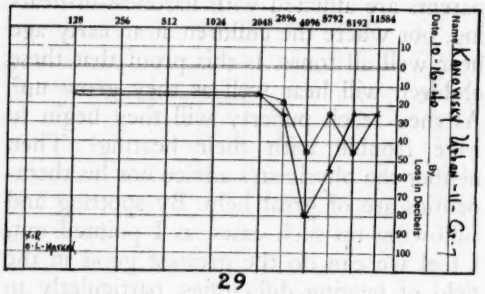

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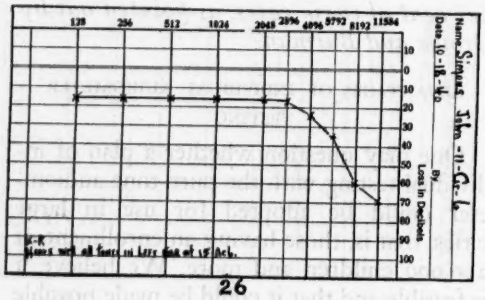

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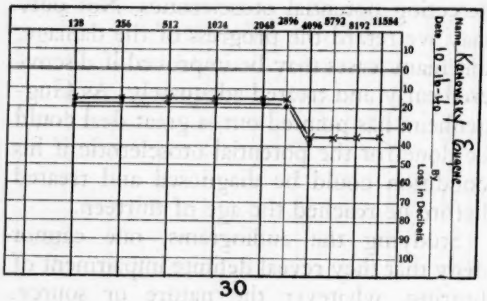

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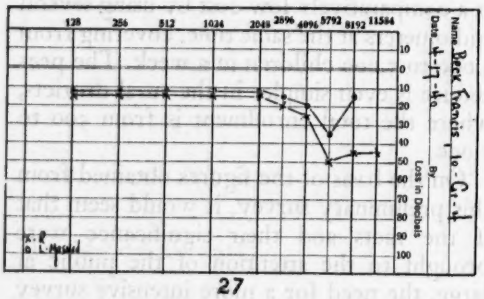

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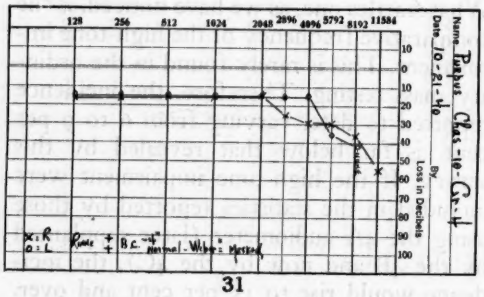

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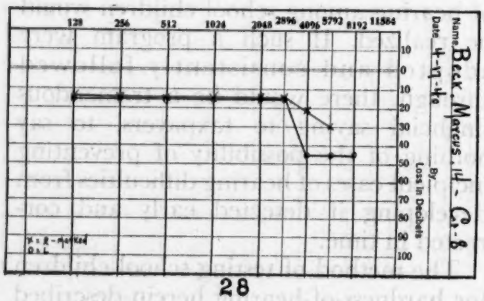

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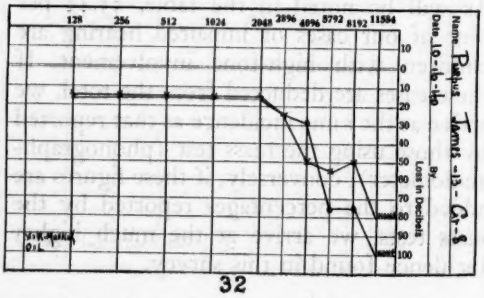

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than the one carried out with the mass test. With the latter, two machines, the 4C (phonograph-record) and the 2A, or its equivalent, are necessary to determine the hearing loss, thus making the cost of the mass test more than treble that involved in the method herein described. Furthermore, the results do not include cases with high-tone impairment and children below grade 4. In our method all tones are tested (not only the conversational voice), the children in the lower grades are included, and only one conversational voice), the children in the lower grades are included, and only one machine, the pure-tone audiometer, is required for the purpose.

SUMMARY

On the basis of 2,567 individual testings for hearing difficulties in school children, the author points out the superiority of individual audiograms over mass-testing, especially in detecting high-tone impairment. An incidence of around 20 per cent of hearing difficulties was discovered.

BIBLIOGRAPHY

1. Progress Report of the Consultants on Audiometers and Hearing Aids of the Council on Physical Therapy of the American Medical Association, J.A.M.A. 115:854-857 (Sept. 7), 1940.
2. J.A.M.A. 114:1634 (April 27), 1940.
3. Minimum Requirements for Acceptable Audiometers, J.A.M.A. 112:732 (Feb. 25), 1939.
4. Panel Discussion. Information Please: Regarding Hearing Aids and Audiometers, Laryngoscope 1054:1085 (Nov.), 1940.
5. Crowe and Guild: Impaired Hearing for High Tones, Acta Oto-Laryng. 26:138-44, 1938; Yearbook, p. 326.
6. Report of American Otological Society, Representatives of the Committee for Hearing Aids and Audiometers, Laryngoscope 48:519-523 (July), 1938.
7. Audiometers and Hearing Aids, J.A.M.A. 110:723-725 (March 5), 1938.
8. Louis K. Guggenheim: Treatment of Deafness, Laryngoscope 50:773 (Aug.), 1940.
9. E. Wirth: Judgment of Audiograms, Arch. f. Ohren-, Nosen-, u. Kehlkopfh. 142:164-188 (Nov.), 1936.
10. Crowe and Baylor: Prevention of Deafness, J.A.M.A. 112:585-590 (Feb. 19), 1939.
11. Antonio Ciocco: Audiometric Studies on Schoolchildren, Ann. Otol., Rhin. & Laryng. 47:926-937 (Dec.), 1938.
12. Crowe and Burman: Recognition, Treatment and Prevention of Hearing Impairment in Children, Ann. Otol., Rhin. & Laryng. (March), 1941.
13. Horace Newhart: Progress in Conservation of Hearing, Ann. Otol., Rhin. & Laryng. (March), 1941.

SUMARIO

A base de 2.567 pruebas individuales de las dificultades de oído en los niños de escuela, el autor señala la superioridad de los audiogramas individuales sobre el probar en masa, especialmente para descubrir el empeoramiento en los tonos altos. Se descubrió una incidencia cerca de 20 por ciento de las dificultades de oído.

RÉSUMÉ

Deux mille cinq soixante sept écoliers furent examinés pour troubles auriculaires. Pour reconnaître les déficiences dans l'audition des notes élevées, la supériorité des audigrammes individuels est incontestable. Des troubles auriculaires furent décelé dans vingt pour cent des cas.

Выводы

Автор провел 2567 индивидуальных испытаний слуха у детей щкольнаго возраста и пришел к заключению, что индивидуальное испытание аудиограмом дает лучшие результаты, чем массовое испытание, в особенности в узнавании дефектов высших нот.

Pituitary Gland Transplantation*

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JERUSALEM, PALESTINE

THE transplantation of animal pituitary in man has gained in practical interest only in the last few years. Lexer's fundamental work on free transplantations (1919) says of the subject of heterotransplantation, with which we are concerned in this paper, that "it can be excluded forever from all practical use because a rapid and complete degeneration always takes place." In particular reference to the pituitary, it was stated (Knauer) that transplantation is of no vital interest to the surgeon since all previous attempts have failed.

Autotransplantation, which is the only form with any chance to succeed, is naturally not to be considered in man. Homotransplantation, from man to man, is possible only in the rare instances in which the healthy organ of a fresh cadaver (e.g., through an accident) is immediately at hand. In fact, I found in the whole literature only one such case, reported by Hirsch and Demel.[1] In their case the posterior pituitary obtained from a fatal accident was immediately transplanted and "took" without any disturbances.

There still remains heterotransplantation, which, as mentioned above, was previously altogether rejected as a consequence of experimental results. Practical surgery of the endocrine glands has now overcome all the difficulties connected with heterotransplantations, and has attained remarkable success, as will be reported below.

From the Surgical Department, Bikur Cholim Hospital.

The fact that there is no species specificity of hormones is favorable to heterotransplantation. Animal gland products are capable of bringing about typical hormonal changes in man. It can be proved, especially in the instance of the pituitary gland, that in certain cases of hypofunction of this organ, transplantation of fresh calf hypophysis compensates to a certain extent for the deficiency.

This hormonal action is much more effective and of longer duration than the results obtained by injections of pituitary extracts. The effect sets in immediately and strikingly; it is not delayed for a few weeks, as is assumed by one author. This can be observed, for instance, in diabetes insipidus, where the polydipsia and polyuria promptly decrease from day to day. The same is the case in Simmond's cachexia, in which the patients react in the first few days after transplantation, showing gain in weight.

DURATION OF CLINICAL EFFECT

It is possible that in the course of some weeks or months the implanted pituitary is subject to resorption. All experiments on animals seem to confirm this view. In three months' time the implanted organ is practically altogether resorbed. Notwithstanding this fact, the clinical effect persists, sometimes even for years. Various explanations may be given for this fact.

First, the transplantate may stimulate in some way the lowered function of the hypophysis. Acting as a stimulus,

it may help in restoring normal conditions in the mechanism of the pituitary gland. This effect may last, even though on anatomical examination no more living cells are found in the transplantate.

A similar stimulating effect may extend to other endocrine glands having reciprocal relations with the hypophysis: thyroid, adrenal cortex and sex glands. This may be another reason for an effect of long duration.

At any rate, this effect is not subject to any fixed rules, since in some cases the effect may last for years, in others only for months or even weeks. In the last instance the harmless procedure may be repeated.

TECHNIC OF TRANSPLANTATION

No undesirable by-effects were observed in my cases of pituitary transplantation. With the technic I employ, this operation can be performed on every patient, even in a cachectic state.

In developing this technic I have endeavored (1) to render the procedure as simple and harmless as possible and (2) to handle the transplantate as sparingly as possible, bringing it to its new site with the minimum loss of time. The removal of the pituitary is also simplified as far as possible.

Simplicity of Technic.—All major and traumatizing operations must be a priori discarded, especially the frequently recommended laparotomy with transplantation in the omentum of mesenterium. It is hard to see any reason for the selection of such a complicated procedure. The literature on this subject gives only an incomplete picture of the dangers of this operation, which may sometimes end fatally. Personally, I know of at least three cases of pituitary transplantation into the abdomen involving most severe complications, two of which ended fatally (Conn, Sauerbruch,[5] Kylin[4]). These cases should urge us to abandon completely laparotomy as a mode of transplantation, this method having no advantage and making the intervention unnecessarily complicated.

Even the implantation in a muscular pocket or in the posterior sheath of the rectus muscle is too far-reaching. Although these methods are not very dangerous, they may nevertheless give rise to abscess formation in the abdominal wall. Furthermore, the operation is a deep one, necessitating several layers of sutures, which disable the patient for a longer period.

The most favorable environment for the transplantation is, in my opinion, the subcutaneous fat tissue. It is extremely easy to reach and, owing to its rich vascularization, forms a suitable bed for the transplantate, which comes quickly in touch with its source of nourishment. The place of choice is the anterior thigh.

Deep sutures are thus completely avoided. Personally, I never use them, so as to eliminate all possible irritation. The transplantate disks (see below) are introduced into two pockets of the fat tissue, in which they hold. Only skin sutures are employed. This minor intervention is performed under local anesthesia and does small harm to the patient. In some cases I have tried to prolong the duration of the anesthesia by field block with basic novocain oil or by prolonged conduction block into the n. cutaneus femoris lat. I had the impression that in these cases the healing took place with less irritation, but it is still too early to form a definite opinion.

Treatment of Transplantate.—The removal of the transplantate was a most complicated procedure with all previous workers. In order to observe the absolutely necessary asepsis, the freshly slaughtered calf's head was trephined with all due asepsis, in the hospital or in the slaughterhouse. Matoley,[6] for instance, writes: "After being cut off and

skinned, the calf's head is brought to the operating theater, where the patient is already prepared. The calf's head is isolated and opened up by assistants who have scrubbed up in readiness for operation." Kylin[4] gives a similar description. A rather complicated and time-robbing method!

In the course of time I have developed the following technic: The calf's head is opened by heavy ax blows and the brain is removed. I then apply iodine to the whole cranial base and remove the pituitary along with the bordering dura and chiasma opticum with sterile scalpel and forceps. This procedure takes one minute. The specimen is put in a 2 per cent rivanol solution and immediately transported by car to the hospital.

In the hospital all is prepared for operation. The pituitary is put on a special table and is freed of its covering membranes with a special set of instruments. The chiasma opticum indicates the direction of the anterior lobe. The specimen is then cut with a sharp knife into four disks. These are transplanted into two pockets of the subcutaneous fat tissue, without any fixation sutures.

Some 20 to 30 minutes are required from the moment of removal to the time of imbedding in the subcutaneous fat tissue.

HEALING PROCESS

Healing never takes place by primary intention. Reports in the literature on healing per primam must be regarded with doubt, since the healing process which takes place in the deep layers, especially in the abdomen, can hardly be followed up. On the other hand, this is possible in the subcutaneous tissue.

Heteroplasty always causes a local anaphylactic irritation, even under ideal aseptic conditions. A sterile exudate is always found, usually of hemorrhagic character. It is often accompanied by slight subfebrile temperatures. This exudate is no indication for opening the wound. On the contrary, we refrain from interfering with the wound as long as possible. The exudate is gradually resorbed and the sutures are removed from the tenth to the sixteenth days, in several stages.

It is only after a long time that I have arrived at this technic of removal. In the beginning, when I used to employ the complicated methods of previous workers, I witnessed numerous purulent infections which necessitated a premature opening of the wound, thus interfering with the final results. I can also report a wound erysipelas in this connection. During the last two years all my cases healed smoothly, i.e., the wound necessitated no opening and the exudate was always resorbed.

My personal experience with pituitary transplantation goes back to June, 1937, thus covering a period of over three and one-half years. Most cases were sent to me by Professor H. Zondek, to whom I am also indebted for the stimulation of starting this work.

At the present I am able to report on 18 patients in whom a total of 20 transplantations have been performed. The following conditions were treated:

Simmond's pituitary cachexia	2
Diabetes insipidus	1
Depression with pituitary disturbances	1
Azoospermia	3
Retinitis pigmentosa	4
Amenorrhea and sterility	1
Dystrophia adiposogenitalis with alopecia	1
Pituitary dwarfism	2
Uncertain endocrine disturbances with hypofunction of the pituitary	3
Total	18

CASE REPORTS

CASE 1. The first case of *pituitary cachexia* was operated upon May 17, 1937. The patient was a 50-year-old woman who had lost weight alarmingly and was in a most miserable nutritional condition. After the operation she immediately began to gain weight. This gain in weight increased progressively during several months. Unfortunately, the patient died six months later, following an attempted suicide (not in connection with her illness).

CASE 2. The second patient with pituitary cachexia was an 18-year-old girl. For three years she had complained of discomfort and a sense of fullness in the gastric region, with no hunger sensation but much thirst. Food intake was accompanied with no feeling of satisfaction. Psychic changes also took place; previously gay, she had lately tended to mental depression. Loss in weight amounted to 7 kg. during a few months. At the weight of 37 kg., attempted treatment with forced diet, insulin and pituitary extracts brought no improvement. Gastric ptosis was marked by protracted emptying. Blood sugar was 88; basal metabolism minus 20. Roentgenograms showed a very small sella turcica.

The patient was treated for three weeks with forced diet, insulin, hydrochloric acid and anterior pituitary extract without any improvement physically or mentally. On November 17, 1940, pituitary transplantation was performed. Immediately a gradually increasing improvement set in. The patient gained 5 kg. in the first six weeks. Her appetite grew better, she felt less thirsty and her psychic condition improved considerably. Basal metabolism one week after operation was minus 10. The patient now looks fresh and alive. She menstruates every fourteen days, previously every four weeks. She remains under observation.

CASE 3. Of great interest is the case of *diabetes insipidus*, demonstrating most clearly the prompt and striking effect of pituitary transplantation.

A 50-year-old woman had complained for many years of distressing symptoms; polyuria of 20 liters a day, abnormal thirst, considerable loss in weight, nervous irritability and most annoying pruritus. Treatment with the usual means brought no marked improvement. Posterior pituitary extract in injections and snuff powder gave only transitory improvement.

On November 10, 1938, pituitary implantation was performed. Already the next morning the polyuria and thirst had disappeared. (This occurrence has also been observed by Matoley[3] in 8 cases, so that it cannot be regarded as accidental.) This condition lasted for several days. Also the pruritus diminished considerably in the course of three or four days. On the fifth day after operation, the wound had to be reopened because of suppuration. On this occasion a part of the transplantate was washed out of the wound (wound tamponade). All previous symptoms reappeared immediately: increased thirst, strong polyuria and pruritus.

After the wound infection had subsided and the remainder of the transplantate "took," a sufficiently satisfactory end-result was achieved: gain in weight of 9-10 kg., marked improvement of the psychic state and almost complete disappearance of the pruritus. Urine excretion was reduced from 20 to 6 liters a day. Thirst is still high corresponding to the amount of urine. This on the whole satisfactory condition has lasted to date (two years after operation). A second operation is indicated and promises further improvement, but unfortunately cannot be performed for non-medical reasons.

CASE 4. Since psychic conditions seemed to be favorably influenced by pituitary implantation, it was attempted also in a case of long-lasting *periodic melancholy*. Although this case can be reported here only briefly, it appears to me of special importance, since the severe psychic condition was followed by an evident improvement which has now lasted for two years.

The 35-year-old wife of a physician had suffered for seven years from severe depressions; these took the form of attacks persisting for five or six months. Numerous symptoms indicating pituitary hypofunction were observed. The first pituitary implantation was performed on March 16, 1939; this was followed by a second implantation on May 9, 1939, since in the first operation a part of the transplantate suppurated.

The implantation was followed by a gain in weight of 1 kg. in two weeks. In the course of the following months the patient gained considerably in weight and in general felt well. On May 18, 1940, her husband (a physician) wrote to us from Rumania that he was glad to state that his wife had completely recovered. For the first time in eight years disagreeable mental phenomena had disappeared. According to further communications, this happy physical and psychic condition has lasted up to the present, two years after operation.

On the other cases in this series I wish to report only briefly, since some of the results are not clear, others are negative and some cases cannot be judged because of the short period of observation.

CASES 5-18. In the patient with *sterility and long-standing amenorrhea*, menstruation reappeared several times, to disappear again. The sterility was not influenced.

In the three cases of *azoospermia* no results were obtained by a single implantation.

The case of *dystrophia adiposogenitalis* showed no improvement of the alopecia (face, axilla, mons pubis).

Two children (10 and 11 years old) with *pituitary dwarfism* did not respond to a single implantation with any growth in height.

Three cases of *uncertain hypopituitarism* showed no marked improvement.

Now, a few words concerning the four patients with *retinitis pigmentosa*. The indication for pituitary implantation was made by Professor Zondek, on the assumption that it was worth trying. The assumption was based on the fact that diencephalon, pituitary gland and eye belong to the same genetic unit, which includes the retina.

Hypophysis produces, among other effects, a pigmentotropic hormone which has an immediate effect on the retina. In the Ophthalmological Congress in Cairo (1937), it was emphasized that in disturbances and degenerations of the hypophysis, this hormone suffers changes, leading to retinitis pigmentosa. Treatment with pituitary extracts is said to have given good results in some cases.

On the basis of recent investigations, it may be assumed that retinitis pigmentosa consists of a transmigration of pigment-carrying leukocytic elements through the intact pigment epithelium into the retina. This permeability is said to be controlled by hormonal activity. The permeability may increase following a breakdown of the pituitary activity, thus leading to abnormal pigment deposition.

The attempt to restore hormonal activity and normalize vascular permeability by pituitary implantation was thus justified. It was hoped in this way to stop

the process or, as far as the changes are at all reversible, even to improve the condition.

Of the 4 cases 2 are too recent to allow of any judgment. The third patient is an imbecile girl whose statements are unreliable. Only the remaining case, with due caution, is worthy of comment.

This patient was a 26-year-old woman, born to intermarried parents. Another sister likewise suffers from retinitis pigmentosa. The retinitis in this patient was first observed at the age of 8 years, and grew worse. Visual power diminished and the field of vision was restricted.

On February 15, 1940, a calf's pituitary was implanted, which "took" well. On September 15, 1940, the attending ophthalmologist observed a gradual widening of the field of vision in all directions, which result had not been obtained previously by peroral and intravenous papaverin administration. The patient herself noticed a marked improvement in her condition; this lasted to the end of the year, when it again deteriorated. On January 16, 1941, a second implantation was performed, the result of which is yet to be observed.

It is as yet difficult to state to what extent the transitory widening of the field of vision is due to the operation itself and to what extent to the combination of this with administration of vascular dilating drugs (euphyllin, papaverin, etc.). At any rate, it must be pointed out that it had never before been possible to bring about a widening of the field of vision in this patient by means of vascular dilating drugs alone.

SUMMARY

The author's technic of pituitary implantation is greatly simplified, as regards both the obtaining of material from the calf and the implantation in man. Though slight local reactions always occur, pituitary transplantation performed with this technic is harmless.

The field of indication for this operation is not yet well defined. In Simmond's cachexia and in diabetes insipidus, however, there is no doubt as to the effect. A case of long-standing mental depression was beneficially affected by pituitary transplantation. Implantation was attempted in 4 cases of retinitis pigmentosa; in one, transitory improvement of the field of vision took place.

BIBLIOGRAPHY

1. Hirsch, O., and Demel: Klin. Wchnschr., 1936, p. 111
2. Jeanneny and Foucault: Technique operatoire des glandes endocrines, Paris, 1938
3. Jeaudelize and Drouet: Ophthalmological Congress, Cairo, 1937
4. Kylin: Med. Klin., 1936, no. 28; 1937, no. 45
5. Lexer: Die freien Transplantationen, Neue Deutsche Chir., vol. 26, 1919
6. Matoley: Arch. f. klin. Chir., vol. 191, no. 1
7. Meyer, R.: Wien. klin. Wchnschr., 1937, no. 41
9. Zondek, H., and Kohler: Deutsche med. Wchnschr.,
8. Sauerbruch: Deutsche Ges. f. Chir., 1936
9. Zondek, H., and Kohler: Deutsche med. Wchnschr., 1921, p. 1520
10. Zondek, H., and Wolfsohn, G.: Schweiz. med. Wchnschr., 1940, no. 8

SUMARIO

La tecnica de implantacion de injertos heteroplasticos de la glandula pituitaria desarrollada por el autor ha sido grandemente simplificada, tanto en la manera de obtener el injerto de la ternera como su implantacion en el hombre. Con esta tecnica las reacciones que generalmente siempre se presentan son muy benignas y de tipo local. Las indicaciones de esta operacion no han sido aun todavia bien definidas. En la caquexia de Simmond y en la diabetes insipida los resultados son satisfactorios. Un caso de depresion mental de larga duracion fue muy beneficiado con este metodo. En cambio en cuatro casos de retinitis pigmentosa que fueron operados solo uno presento una mejoria temporal del campo de la vision.

RÉSUMÉ

La technique de l'implantation de la glande pituitaire est simplifiée sout le rapport de l'obtention de la glande du veau et de son implantation chez l'homme. Inoique il y ait toujours une légère réaction locale l'implantation de la glande avec la téchnique de l'auteur est sans danger. Les indications de cette opération ne sont pas encore bien definies. Dans la cachexie de Simmond et dans le diabète insipide, l'operation donne d'heureux résultats. Un cas de dépression mentale de longue durée montra. Une grande amélioration après l'implantation de la glande pituitaire. Dans quatre cas de retinite pigmentèe, l'implantation fut effectivèe; dans un des cas, une amélioration temporaire du champ visuel fut obtenue.

Выводы

Автор описывает технику имплантации мозгового придатка, как его препаровку утелят и его пересадку человеку. Операция совершенно безопасна. Показания для воспользования этой операции пока еще мало разработанны. Нет сомнения, что получается эффект в кахексии Симмондса и в диабете инсипидус. Трансплантант мозгового придатка оказал хорошее влияние в случае длительной ушественной дипресии. Трансплантация была сделанна в четырех случаях ретинитис пигментоса; в одном случае получилось временное улучшение в поле зрения.

War Surgery Meeting

At A time of national emergency, such as we now face, intellectual forces aptly adapt themselves to circumstances under which they must advance. Therefore, to fill the need for inspiration and information with regard to the war medical problem, two great medical societies, the American Academy of Orthopedic Surgeons and the Clinical Orthopedic Society, have combined their annual meeting to meet this challenge. This joint meeting will be held on January 17, 18, 19, and 20, 1943, at the Palmer House in Chicago. The keynote of this occasion will be "War Surgery" and its application to civil practice. Those members of the medical profession in good standing, who are interested in bone and joint surgery and its allied fields, may have the privilege of attending.

There will be four sections of interest connected with this program.

1. A clinical program.
2. A general scientific assembly.
3. An instructional section.
   (a) Group discussion courses.
   (b) Motion pictures of surgical methods and technic.
4. Scientific exhibits.

The speakers and faculty are drawn from the leading surgical authorities of this country, as well as distinguished guests from England, Canada, South America and the Hawaiian Islands. These will include a sizable group of Army and Navy surgeons who have had to deal directly with the war casualties from across both oceans.

Thorough, concise, short discussion courses will be offered on the following subjects. Each will have an outstanding faculty, many of whom are in military service.

I. Surgery of the Hand.
II. Fractures.
III. Peripheral Nerve Injuries.
IV. Amputations.
V. Lame Backs.
VI. Surgery of the Hip.
VII. Surgery of the Knee.
VIII. Burns and War Plastic Procedures.
IX. Foot Disabilities.
X. Differential Diagnosis of Bone Pathology.
XI. Reconstructive Surgery Following Trauma of the Upper Extremity.
XII. Surgical Anatomy.

There will be several special features in connection with the general program.

(A) An afternoon devoted to "Complicating Trauma Associated with Orthopedic Casualties." This will include a discussion of the following subjects:
   1. "Shock—Its Early Recognition and Treatment."
   2. "Blast, Crush and Compression Injuries."
   3. "Thoracic Injuries."
   4. "Head and Spine Injuries."
   5. "Gunshot Injuries to Abdomen."
   6. "Injuries to Genito-urinary Tract."

(B) One evening will be devoted to the subject of "Chemotherapy in the Treatment of Wounds," with discussions by eminent authorities who have studied the subject from various angles.

(C) Another evening will be given to a debate on "The Kenny Treatment for Anterior Poliomyelitis."

There will be no time for play. Morning, afternoon and evening will be devoted entirely to the problems as they have been outlined. As has been stated previously, members of the medical profession who are interested in such a program are welcome to attend, and may receive an invitation by writing to the Secretary, Dr. Myron O. Henry, 401 Medical Arts Building, Minneapolis, Minnesota. If you expect to attend, hotel and railroad reservations should be made early.

The Rôle of a New Obstetric Delivery Forceps in Mortality

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ACCORDING to the Vital Statistics of the United States[1], about 61,000 deaths occur in the first week of life, which is about 50 per cent of the total deaths during the first year. The obstetric delivery forceps, first invented in 1854, has been one of the most effective agents in reducing both maternal and fetal mortality and morbidity when properly used.

Toverud[2] studied the autopsies of 534 premature and 419 full-term infants. He found intracranial hemorrhage in 370, or 38.8 per cent. Another study was made by Bundesen and his associates[3], who found that such hemorrhage was the predominant cause of death in 1,642 cases, or 22.7 per cent. McNeil[4] states that intracranial hemorrhage is the largest single factor in neonatal deaths, especially if we consider not only the fatal causes, but also those babies who survive with crippled minds and bodies. It has been estimated that intracranial hemorrhage manifests itself clinically in from 1 to 2 per cent of all infants, and that about 25 in every 100 of those who survive do not develop normally[5]. It is thus evident that intracranial hemorrhage in the newborn is a major factor in infant mortality and morbidity, and that its control and prevention are problems demanding serious consideration.

The thesis that the proper application of forceps in maternal and fetal conditions indicating their use constitutes a major approach to reducing maternal and fetal mortality appears tenable. On this basis I have attempted to analyze the various types of female pelves and to devise an obstetric forceps requiring only a single application, minimizing the transmission of infection in the genital tract and reducing the likelihood of maternal or infant death (Figs. 1, 2 and 3).

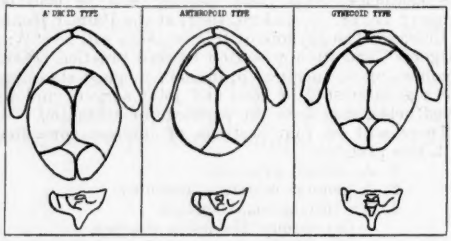
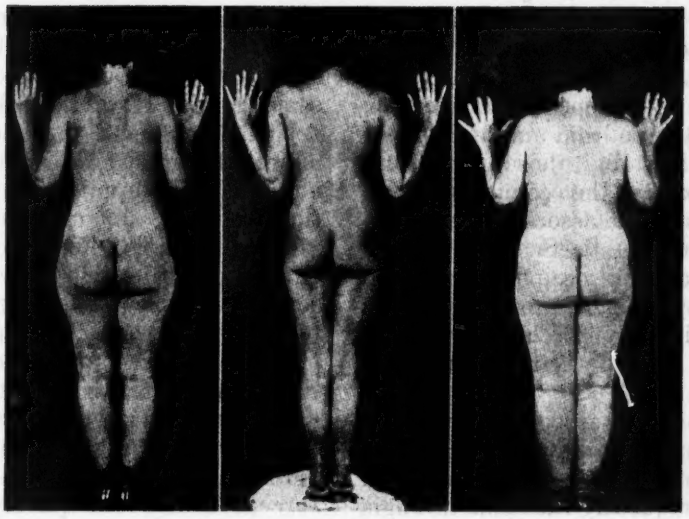


Fig. 1. (Left)—Male type pelvic arch, with fetal head forced posteriorly toward sacrum.
Fig. 2. (Center)—Male type pelvic arch, with fetal head in occipito-posterior position, utilizing compensatory space.
Fig. 3. (Right)—Female type pelvic arch, with fetal head fitting under symphysis.
(Taken from Thom's "Obstetric Pelvis." Williams and Wilkins Co., Baltimore, Md.)

An understanding of the variations of the anatomic parts is fundamental in obstetric delivery, as in other operative procedures. Caldwell[6] and his associates describe 12 types of pelves in a series of 215 consecutive primiparæ, 4 of which are of obstetric significance. These parent forms have many intermediate gradations, but if the influence on parturition and forceps delivery of the four principal types is understood,



A. *B.* *C.*

Fig. 4. Physical form *versus* pelvic type. *(A)* The gynecoid type. Note the narrow shoulders and waistline and the broad hips. The lower legs are well curved and tend to be slender. *(B)* The anthropoid type. The shoulders are broad and the hips narrow. The legs are straight and slender. *(C)* The android type. Posteriorly, the body is square. The waistline is thicker than in the other types. The legs are straight. The thickness of the thigh is preserved throughout the lower legs into the calves, the ankles and the feet.

proper delivery of the intermediate types will naturally follow.

Inexperienced observers will encounter little difficulty in recognizing examples of the parent types of pelves—the gynecoid, the android and the anthropoid. The intermediate forms, however, may present difficulty unless their anatomic relationship to the parent types and the general conception of the factors responsible for the diversity of form observed in living women are clearly understood (Fig. 4).

Efforts are continually being made to combat the source of infection in obstetric cases by meticulous care and by adhering to established rules.

At the White House Conference, in 1931, Plass[7] reported that in a series of 145,812 obstetric cases, forceps were used in 17.9 per cent. Infection may be introduced not only by the operator's hands or by the instrument itself, but by trauma to the mucosa and musculature of the generative canal, thus reducing the blood supply and vitality of the tissues and creating an ideal culture medium.

One application of the forceps may carry infection into the vaginal tract and uterus, but additional applications multiply the likelihood of infections. Yet, De Lee[8] describes a method of rotating the head from an occiput-posterior to an occiput-anterior position (180 degrees) by forceps manipulations in which four separate applications are required. Vedder[9] advocates the use of the Kielland forceps for such a maneuver and advises that the forceps be reapplied for each three to five degrees of rotation accomplished, thus necessitat-

ing between 36 and 60 applications.

Certain factors, such as pelvic types and different presentations of the fetus, make the use of forceps imperative. For example, in the android and anthropoid types of pelves and those with compensatory space in the occipital portion, Caldwell[10] and his associates found it necessary to reverse the Scanzoni maneuver and rotate the occiput-anterior to the occiput-posterior presentation by forceps manipulations. This occurred in over 40 per cent of their series of 215 cases.

These two types of pelves have compensatory space posteriorly, the anterior part of the inlet being narrow. A small baby frequently will come through, but difficulty in rotation usually occurs if it passes the inlet in the posterior position. Consequently, when these pelvic types are recognized, the operator will find delivery of the head with forceps the method of choice in the persistent posterior position. Furthermore, it is mechanically wrong to attempt to rotate the fetal head from a wide diameter through a narrow one. This principle holds true in the delivery of the aftercoming head in a version and breech extraction. Hence, if possible, it is logical to rotate the head to an occiput-posterior position in the inlet itself. Titus[11] advocates this procedure in delivery through the android and the anthropoid types of pelves.

The application of any of the forceps now in use (all of which have a fixed pelvic curve) does not allow the head to flex, extend or rotate during traction. As a result, unnatural relations occur in the birth canal during traction, so that injury to the baby's head and to the mucosa and musculature of the generative tract result, with the possibility of infection.

With these basic and other corroborative facts, adequate reason presented itself for continued study and improvement of all known methods of forceps construction and use. The question presented was: "How might the forceps be designed and used in order to reduce maternal, natal and neonatal deaths by minimizing reapplication and infection?"

Since forceps delivery occasions unnatural relationships between the passenger and the passage, it is necessary to have the forceps designed in such a manner as to comply closely with the natural factors which affect delivery. In this connection, two essentials must be kept in mind: (1) It is best for both mother and child to terminate any forceps delivery as quickly and simply as possible, (2) the forceps must be capable of absolute sterilization and asepsis.

On these premises, the technical problem may be summarized in the following points: (1) Rotation of the child's head should not be restricted by the operator's grip on the forceps handle (this might be avoided by a universal joint); (2) movement of the head in the longitudinal axis of the birth canal requires a flexible forceps to avoid injury; (3) pressure of the blades on the head should be reduced to a minimum, and the head, while in the forceps, should be free to flex, extend and rotate during traction; (4) the usual stiff bond between the head of the child and the operator's hand should be eliminated by a full universal joint, as the hands are not sensitive enough to feel the tendency of the head to rotate, flex or extend to the available compensatory space; (5) reapplication of the forceps should be unnecessary, as it would be by inclusion of a universal joint; (6) simple construction, safety of manipulation, capability of and absolute asepsis are imperative; (7) the forceps blade should change its pelvic curve automatically during any

rotary movement in order to follow the curve of the bony pelvis; (8) it should be an all-purpose forceps, incorporating ease of application and axis traction; (9) it should give equal dilation of all parts of the vaginal canal during traction, avoiding episiotomy if possible, and preventing deep muscular tears into the rectum, and (10) by avoiding the necessity of reapplication, it should eliminate reversion of the head to its original position during rotation.

Among the previously designed forceps none exists which solves the problem of flexion, extension and rotation of the child's head in such a manner that the entirely unhindered, yet powerful, work of pulling can take place. This fact is most obvious in the forceps that have been most practical and applicable. Actually, in the most common case in which the aid of forceps is necessary, the head must rotate and the entire forceps must rotate with it.

With the forceps now used, if the operator resists the rotary tendency, the head, due to the pressure exerted upon it by the walls of the birth canal, must turn within the blades. If the obstetrician rotates the forceps now in use, the head is injured by the blades and the soft parts of the birth canal are torn. These damages may result, even though the head is held in the forceps in the seemingly correct position. When the pelvis is normal and if the instrument is properly used the forceps delivery may progress satisfactorily. However, if the pelvis is deformed, the ill-effects of a so-called normal position become obvious, because the hands holding the forceps handle are not sensitive enough to feel the tendency of the head to rotate within the blades to find the compensatory space it would follow automatically without forceps. If the blades of the forceps serve only to hold the head firmly, as in the so-called axis-traction forceps, in which the handles are locked in position by a screw and wing bolt, while a special traction handle is attached to the blades, the head has more room for rotation. In this manner, it is easy to secure rotation despite the addition of the extra arms, which are awkward, difficult to apply and are now seldom used. If, however, the physician holds the traction handle tightly, he hinders rotation, even though it is easier to follow the natural movement of the head with this instrument than with ordinary forceps. The one advantage of the axis-traction forceps is that by separating the pulling mechanism from the clamping mechanism the side pressure of the blades is reduced to a minimum.

The ordinary forceps, such as the Simpson or De Lee type, necessitate clamping the head with the handles while pulling on them at the same time. It can be noted, even in the hands of the most expert operator, that it is inescapable for the head to be compressed more than is really desired, because of the necessity for keeping a firm grip on the forceps.

In the vital statistics for 1937 (the last year for which complete figures are available) it was found that of the 10,769 maternal deaths, 2,717 were due to toxemias, 3,719 to infection, 1,319 to hemorrhage, and the remaining 3,014 to "all other conditions." This means that conditions arising during delivery may have played a part in 8,052 of these deaths, and probably did so in 5,038 cases.

Intrapartum and postpartum hemorrhages are often the result of improper conduct of the second or third stage of labor. Many cases of forceps deliveries fall into such a category, which are also prominent factors in maternal deaths due to infection, in spite of the modern use of sulfa preparations. Maternal deaths in the United States, now reduced to 10,000 annually, portray a situation in

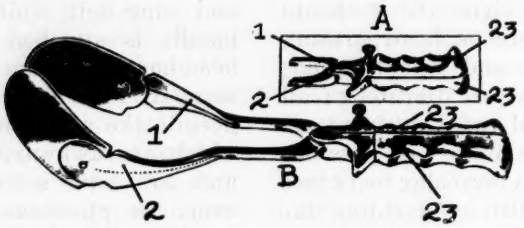


Fig. 5. The LaBreck forceps, showing in *A* the handles (23) rotated at an angle of 90° to the plane of the blades (1 and 2); in *B* the handles are locked in the same plane as the blades. The lock-nut and the grooves in the shanks (1 and 2), in which the blade-lock slides to hold the blades securely in any of the three positions shown in this figure, are also illustrated.

which there is still room for improvement.

With these criteria for perfecting the ideal forceps, and the faults or disadvantages of other forceps in use, I have designed a new instrument, the primary object of which is the reduction of fetal, maternal and neonatal mortality. The new forceps resemble, in general, De Lee's modification of the Simpson forceps (Fig. 5), and are as easily applied, since the thinner blades will occupy less space in the birth canal. The possibilities of free rotation, flexion and extension of the head, as well as the insertion of an elastic mechanism for the purpose of overcoming the friction of the head, is the anticipated achievement.

The forceps may well be considered as new in both principle and design, because, although their application is the same as the Simpson instrument, the swivel or ball joint, bilaterally, frees the head from any hindrance traceable to rotation, flexion or extension due to the pull of the operator. The head can gradually and fully turn automatically to conform with the diameters of the birth canal, in spite of the direction of the pull exerted upon it.

Rotation of the head is due to the pressure of the soft portion of the pelvis, especially posteriorly, which is Nature's attempt to adjust the fetal head to the compensatory space in the pelvis. It is possible to prevent any hindrance to the free rotation, flexion or extension of the head by the use of the new forceps, which thus permit the replacement or assistance of the powers of natural labor by a forceps operation made to conform as closely as possible with normal conditions.

A lock is provided in the shanks to hold the forceps blades in a fixed position. This can be released by the operator after application of the forceps, thus allowing automatic free movement of the blades and the head during rotation and delivery.

The new blades are designed to fit the head. Consequently, all curves are cephalic, so that the blades automatically adjust themselves to the pelvic curve when necessary. This contingency is provided for by a joint near the center of each blade (Fig. 6), which assists the adjustment during the rotating of the head from the occiput-posterior to the occiput-anterior position, or vice versa, for delivery.

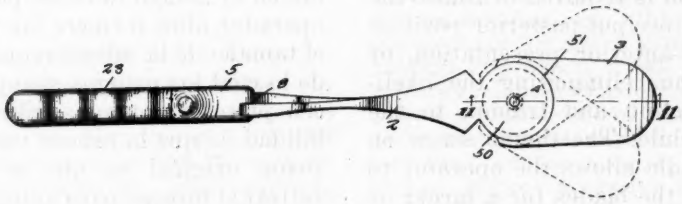


Fig. 6. Side elevation, showing the position the blades may automatically assume during rotation of the child's head.

The aim of the forceps is to provide an instrument (1) permitting axis traction combined with universally jointed action, and capable of being applied and manipulated easier than other forceps now in use; (2) rotating the head from the occiput-posterior or to the occiput-anterior position, or vice versa, with one application, the blades of the forceps automatically changing to the required pelvic curve for delivery; (3) affecting equal distribution of pressure throughout the vaginal tract, so that episiotomy may often be unnecessary; (4) eliminating a stiff bond between the head of a child and the physician's hand, the construction being such that during traction the head can rotate, flex or extend to a favorable outlet, there being no restrictions due to a tight grip of the operator's hand on the forceps; (5) by rotating the grip through 90 degrees, the shanks of the forceps levers will be locked together, preventing the working portions of the levers from opening so that the physician has a means within easy control whereby the forceps may be locked in position against spreading, and (6) permitting adjustment through a screw in the handle to fit blades on the head.

BIBLIOGRAPHY

1. Vital Statistics of the United States, (1937), Part I. U. S. Dept. Commerce, Bureau of the Census, Washington, D. C., 1939

2. Toverud, K. U.: Etiologic Factors in Neonatal Mortality, with Special Reference to Cerebral Hemorrhage. Acta Pædiat., 18: 248, 1936

3. Bundesen, H. N., Fishbein, W. I., Dahms, O. A., Potter, E. L., and Volke, W.: Factors in Neonatal Deaths. J.A.M.A., 111:134 (July 9), 1938

4. McNeil, C.: Death in First Month and First Year. Lancet, 1:819 (May 4), 1940

5. Roberts, M. H.: Intracranial Hemorrhage in Newborn. J.A.M.A., 113:280 (July 22), 1939

6. Caldwell W. E., Maloy, H. C., and D'Esopo, D. A.: Further Studies on the Pelvic Architecture. Am. J. Obst. & Gynec., 28:482 (Oct.), 1934

7. Plass, E. D.: Relation of Forceps and Cesarean Section to Maternal and Infant Mortality. Am. J. Obst. & Gynec., 22: 176-198 (Aug.), 1931

8. DeLee, J. B.: Principles and Practice of Obstetrics. Philadelphia, W. B. Saunders Co., 8th Ed., p. 1100

9. Vedder, J. B.: Improved Technic in Use of the Kielland Forceps. Wisconsin Med. J., p. 103 (Feb.), 1940

10. Caldwell, W. E., and Maloy, H. C.: Anatomic Variations in the Female Pelvis and Their Effect in Labor, with Suggested Classifications. Am. J. Obst. & Gynec., 26: 479 (Oct.), 1933

11. Titus, Paul: Management of Obstetric Difficulties. St. Louis, C. V. Mosby Co., chap. 18, p. 418, 1937

SUMMARY

The advantages of this forceps are that it is more easily applied than the Simpson forceps because the blades are thinner. When in place and locked, as traction is applied, the head can be free to flex, extend or rotate to pass easily through the birth canal. Movement of the head along the longitudinal axis of the parturient canal is facilitated by its use. It reduces the pressure of the blades to a minimum and equalizes the distribution of compression in all parts of the birth canal during traction. The stiff bond between the head of the child and the hand of the physician is eliminated because the head can extend, flex or rotate as the pelvic curvatures require.

The forceps is simply constructed for safe manipulation and asepsis, but

possesses axis-traction features. Only one application is required to rotate the head from an occiput-posterior position to an occiput-anterior presentation, or vice versa, thus eliminating the likelihood of infection and trauma to the mother and child. The thumb screw on the right handle allows the operator to open or close the blades for a larger or smaller head, after which the handles are always kept together or closed. It prevents the possibility of the head reverting back to its original position, as no change of forceps is required during rotation. The blades can be locked on the head by turning the outer handle to the right or the left by one-quarter turn.

SUMARIO

Las ventajas de este fórceps son, principalmente, que es de mas fácil aplicación que el de Simpson porque las ramas son mas delgadas. Cuando está colocado en posicion y articulado, mientras se aplica traccion, la cabeza queda libre para flexionar, extenderse o rotar progresando con facilidad a lo largo del canal pélvico. Los movimientos de la cabeza a traves del conducto pelvigenital se hacen mas fáciles por su medio. Reduce la presión de las ramas a un grado minimo y la distribuye con igualdad en todas partes del conducto pelvico mientras se ejerce traccion. La conexión rigida entre la cabeza del niño y la mano del partero queda eliminada y que la primera puede extenderse, flexionar o rotar segun lo requieran las curvas del conducto pélvico.

El fórceps está construido de una manera sencilla para darle mayor seguridad y asepsis en su empleo y además poseé las cualidades de un fórceps de eje de traccion. Una sola aplicación basta para rotar la cabeza de una posición occipital posterior a la anterior, o vice versa, disminuyendo asi las probabilidades de infección y traumatismo para la madre y el niño. El tornillo can orejetas en el mango derecho permite que el operador abra o cierre las ramas según el tamaño de la cabeza requiera, despues de lo cual los mangos siempre permanecen juntos y cerrados. Elimina la posibilidad de que la cabeza vuelva a su posicion original ya que no se necesita retirar el fórceps para aplicarlo de nuevo durante la rotacion. Las ramas pueden articularse, con las cucharas sobre la cabeza, con solo rotar el mango externo hacia la derecha o la izquierda, un cuarto de circulo.

RÉSUMÉ

L'avantage de ce forceps est qu'il est d'une application plus facile vu que les lames en sont plus minces. Une fois appliqué et fermé la traction étant faite la tête peut être fléchie, étendue ou tournée afin de suivre facilement les voies maternelles. Ce forceps, facilite le mouvement de la tête dans l'axe longitidunal des voies maternelles. Il diminue la pression des lames au minimum, et distribue durant la traction la pression sur toutes les parties du passage maternel. La tête peut être fléchie, etendue et tourneé selon des différentes courbures du bassin le forceps est d'une construction simple et permet une manipulation davice, l'obtention de l'asepsie et la traction axiale une seule application permet la rotation de la tête de la position occipitale postérieure à la position occipitale antérieure ou vice versa, et élimine ansi la probabilité d'infection et de lesions de la merte et de l'enfant.

Une vis permet l'ouverture et la fermeture des lames pour l'accommodation d'une tête ou plus grande ou plus petite après quoi les lames, sont toujours emsemble ou fermeés. Ce forceps empêche le retour de la tête à sa position originale, car on ne change pas le forceps dans le cours de la rotation. On ferme le forceps sur la tête en tournant le manche

extérieur d'un quart de rond a gauche ou a droite.

Выводы

Преимущество этих щипцов в том, что они легче применяются чем щипцы Симпсона, так как их руки тоньше. Когда щипцы накладываются и при тракции то голова может сгибаться, растягиваться, или-же повернуться и легко двигаться по родительному каналу. Тракция этими щипцами помогает движению головы вдоль продольной оси. Давление щипцов уменьшается до минимума и распределяется по всем частям родительного канала. Голова в состоянии сгибаться, растягиваться или же воротиться сообразно изгибам таза. Щипцы устроенны просто—для безопасго употребления и асептики, но вместе с тем пригодны для тракции. Накладываются только односторонно для того, чтобы повернуть голову от задней окцинитальной позиции, или передней окцинитальной позиции, или же на оборот, исключая таким образом травшу и инспекцию для матери и ребенка. Когда щипцы закрыты, то голова уже не может повернуться обратно к своей прежней позиции, так как щипцы не меняются во время маневра поворота головы.

ANNOUNCING THE FOURTH INTERNATIONAL ASSEMBLY OF THE INTERNATIONAL COLLEGE OF SURGEONS TO BE HELD AT THE WALDORF-ASTORIA HOTEL, NEW YORK CITY, JUNE 14 to 16, 1943.

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Pneumatic Rupture of the Intestine—A Case Report

A. J. GUZZETTA, M.D., F.I.C.S.
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THE increase in industrial work throughout the country undoubtedly will be accompanied by an increase in the number of unusual accidents. Hence the report of this case at the present time, although it occurred some time ago.

The introduction of air into the rectum in all cases reported has been either a result of fooling and joking, or due to accidental dusting of clothing with an air hose. To effect pneumatic rupture of the intestine it is not necessary that the air hose nozzle be inserted into the anus; it is enough that it be pressed against the clothing or within an inch or two of the body.

Symptoms.—The symptoms in general are those of profound shock, distended abdomen, rigidity of muscles with considerable pain, and tenderness over the abdomen. The temperature is subnormal or slightly elevated if some time has passed from the time of the occurrence of the perforation. In the case here reported, the air within the abdomen was absorbed, or else the small perforated mucosa did not permit a large amount to enter the abdominal cavity. The respiration and pulse both increased.

Prognosis and treatment.—The mortality rate has varied from fifty to seventy per cent, even though most patients were operated on within a few hours. Death results from peritonitis due to spilling of intestinal contents from lower bowel, from hemorrhage, and from shock. The danger is similar to that of any perforated viscera, the longer the interval the greater the mortality.

The treatment is surgical. The method will vary with the pathology which presents itself. In one case, a colostomy may be deemed advisable. In a second case, after closing the perforation and suturing the lacerations, introducing drains and sulfathiazole in the peritoneal cavity may be deemed advisable.

CASE REPORT

The patient under consideration gave the following history when first examined, twenty-six hours after the accident:

While passing boiler room on his way to the lavatory, about four-thirty P.M., a fellow employee held or threw an air hose at him. He felt a sudden pain in the rectum and scrotum. The pain was alleviated slightly by evacuation of bowel contents. He continued to work until five P.M., but had to have help to close the car door—a duty which he ordinarily performed alone. Pain continued during the night. The following morning the patient was unable to return to work. The pain came at intervals during the day. He was able to walk, with great difficulty, to the doctor's office, a distance of about one and one-half miles, though he had to stop and rest because of the severe pain. The patient was examined at six-thirty P.M. and advised to go to the hospital. He refused and returned home in a street car. Four hours later, the pain increased. He was again examined and sent to the hospital. No vomiting occurred at any time and the pain decreased when he was in bed or sitting in a chair.

Physical Examination: Patient looked quite ill when first seen. Face contorted. Head, eyes, teeth and tongue were normal. Neck: no adenitis. Chest: heart, apex, fifth interspace sounds regular, good quality. Aortic sound: regular. Pulmonic sounds: good. Lungs: good resonance throughout on percussion. Auscultation: normal. Inspection: equal expansion. Palpation: no thrills present. Oral temperature: 99.8; pulse: 84. Abdomen: no distension. Tenderness over lower abdomen, especially marked in medial line, suprapubic. A sausage like mass, three to four inches long could be palpated two

inches to the left of median line. This mass was quite tender.

Physical examination four hours later, when patient consented to go to the hospital: Signs of tenderness and slight rigidity of abdomen, involving the area three inches below umbilicus down to pubis. Because of rigidity, mass could not be felt at this time.

Diagnosis: Pneumatic rupture of the intestines.

Pathology: Multiple lacerations in all directions of various coats of sigmoid, with hernia of mucosa. Small perforation present. Entire bowel, large and small, markedly congested. No free air in abdomen. Peritoneum injected. Free blood in peritoneum. Appendix small. Lower eight inches of sigmoid walls torn.

Operative procedure: Mid-line incision below umbilicus. Small perforation of sigmoid sewed. The muscular and mucous coats of the sigmoid and rectum, which were torn in various directions, were sewed in layers. Blood in cul-de-sac was removed. Two drains were inserted in the pelvis. Serous layer was sutured as necessary. Perforations were closed. Abdominal incision closed in layers.

Laboratory reports: Urine: specific gravity, 1022, no alubmin or sugar. Hemoglobin: 90%, RBC: 5,200,000, WBC: 5,900, Polymorphonuclear: 79, Large Monocytes: 14, Lymphocytes: 7.

Postoperative treatment: Patient's abdomen was distended until flatus was expelled by use of the rectal tube. On the fourth day following operation, feces were expelled by means of a low enema, making the patient more comfortable. Drainage tubes were removed on the sixth day. Sutures were removed on the tenth day. Patient was up and about the ward after three weeks and discharged from the hospital four days later in good condition, except for the skin of the incision, which had not healed for about one-half inch. Patient has had no disturbance of any kind since, except slight attacks of abdominal pain.

SUMMARY

This case of pneumatic rupture of the intestines was operated on about thirty hours after the accident. Complete recovery resulted. Unlike the cases previously reported, no free air was noted within the abdominal cavity. This patient was awarded compensation.

BIBLIOGRAPHY

Patterson, D. C.: Compressed Air Rupture of Intestines, New England M. J., January 16, 1930

Shoemaker, H.: Rupture of the Sigmoid by an Air-Blast of 120 pounds pressure, J.A.M.A., **61**:1898, 1913

Redel, W. A.: Rupture of Sigmoid Colon by Compressed Air Hose, Bull. Moses Taylor Hospital, **1**:19, 1923

Block, F. B. and Weissman, M. I.: Pneumatic Rupture of the Sigmoid, J.A.M.A., **86** (May 22) 1926

Hays, G L.: Pneumatic Rupture of the Bowel, Surg. Gyn. and Obst., **43**:491, (Oct.) 1926

SUMARIO

Este caso de rotúra pneumática del intestino fué operado como treinta y séis horas despues del accidente, con cura completa. No aire libre fué notado dentro de la cavidad abdominal, diferente que los casas previamente reportados. Este caso cobró compensación de la compañia de segúros.

RÉSUMÉ

Ce cas de rupture pneumatique de l'intestin fut opéré trente heures après l'accident. Il n'y avait aucun air libre dans la cavité abdominale; dans les cas rapportés antérieurement on a toujours trouvé de l'air libre. La malade fut dédommagé par l'assuré (compagnie d'assurance).

ВУЛФСОН

Пациент с пневматическим разрывом кишек был оперирован через тридцать часов после случая. Пациент выздоровел. Случай отличался тем, что в брюшной полости не было воздуха. Пациенту выдана компенсация.

INTERNATIONAL COLLEGE OF SURGEONS

For information concerning membership write to Mr. Ralph Osborne, *Business Secretary*, International College of Surgeons, 1512 Spruce Street, Philadelphia, Pa.

X-Rays in Identification

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IT WAS thought that the image of a patient imprinted on an X-ray film at the time of the exposure of the X-ray would be of value not only from the point of identification, but also in medicolegal cases, particularly to avoid substitution.

Experiments were carried out to obtain, if possible, the photograph of a patient jointly with his X-ray as a means of identification by printing his image in the X-ray film. This was accomplished by exposing the negative of the face of the patient in such a manner so that it would become a positive. The procedure is the same as for any photographic exposure, since the roentgenographic technic required makes the impression of the face possible. It was discovered that while X-rays through the screen produced the photographic impression, the same technic could not be used in all types of X-ray exposures because the print of an individual photo-negative always requires the same intensity of X-ray energy.

In view of the above, another method was tried by which the degree of X-ray energy required to obtain a proper image, regardless of the radiographic technic, could be calculated. When the X-ray technic was of greater intensity than that required to obtain the photograph of the patient, the latter did not appear distinct (Fig. 1). Because of this, aluminum filters of a determined thickness were used in order to retard the quantity of rays until the correct impression of the patient's photograph could be obtained. The filters were aluminum plates of equal thickness (1 mm.). The object was to determine the number of aluminum plates needed in each case, in this way filtering the amount of rays left. Some of the results were obtained with a General Electric Model D, shockproof, 15 Ma. unit, Iso-Victor (quick) developer, Eastman Kodak fixer and blue brand ultra speed films (Table I).

The technic is as follows:

The patient is photographed while the history is written. After the negative is obtained it is developed immediately, then washed in pure alcohol to dry promptly, and placed before an electric fan for about 5 to 7 minutes—less time than is required for an examination. The photographic negative is then placed in the chassis below the X-ray negative, and its contours are marked on the chassis with a pencil. Exposure of the film is then made with the filters indicated, and a roentgenogram is obtained which simultaneously records the patient's identity (Fig. 2).

This method may be used successfully in cases of trauma to identify persons who have been injured previously, claiming disability for a new injury. It may also be a valuable method in other forms of identification because it permits a comparison of the photographic image and the X-ray features.

*In collaboration with Mr. Manuel Gonzalez, X-ray technician.

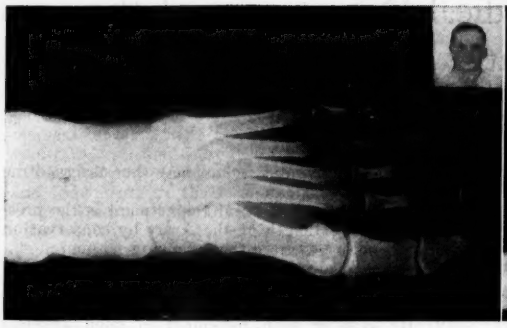

Fig. 1. Technic without filtration, producing indistinct photograph of patient.

Fig. 2. Results of technic with filtration.

SUMMARY

A new method of incorporating the patient's photograph into a simultaneously exposed X-ray film is described. Its value for identification and medicolegal purposes is pointed out.

RÉSUMÉ

Une nouvelle méthode d'incorporer simultanément la photographie du sujet dans le filme au rayon X est decrite. L'auteur indique la valeur de ce procédé qui fixe l'identite du sujet et que peut rendre de grands services sous le rapport médicolégal.

SUMARIO

Se ha descrito un nuevo metodo de incorporar la fotografia del paciente en la pelicula radiografica. Se ha apuntado el valor de este metodo como medio de identificacion y bajo el punto de vista medicolegal.

Выводы

Автор описивает новый способ инкорпорации фотографии пациента в рентгеновском снимке. Выгода способа в возможности отожествления и для врачебных легальных целей.

TABLE I.—RADIOGRAPHIC TECHNIC

	Position	Type*	Selector	Transformer	Milliampere	Distance	Time	Bucky Diaphragm	Screen	Aluminum Filter
						(in.)	(sec.)			(mm.)
Cranium	A.P.	M	High	6	15	25	2½	Yes	Yes	6
	L.	M	High	4	15	25	2½	Yes	Yes	6
Ribs	A.P.	M	High	3	15	30	2½	Yes	Yes	10
Foot	Oblique	T	Low	4	15	30	¼	No	Yes	0
Leg	A.P.	M	Low	11	15	25	¾	No	Yes	6
	L.	M	Low	9	15	25	¾	No	Yes	6
Hand	A.P.	M	Low	3	15	20	¼	No	Yes	0
	L.	M	Low	3	15	20	¼	No	Yes	0
Shoulder	A.P.	T	High	7	15	30	½	Yes	Yes	6

*M = Medium (140-160 lbs.)
T = Thin (not over 140 lbs.)
O = Obese (over 160 lbs.)

Organization of the Medical Department of the United States Army*

BRIG. GEN. O. H. QUADE

FOR my part of the program, I would like to discuss, briefly, the organization of the Medical Department of the United States Army, and particularly that part of it in which I think that you would be interested.

The Medical Department of the United States Army had its origin at the very beginning of our national history, for in 1775, upon the recommendation of General George Washington, the Congress created the first military medical service known in America. It remained very loosely organized until 1818, in which year the Congress passed a Bill which provided a Medical Department for the Army, headed by a Surgeon General, and set up a central organization. The first Surgeon General under this law was Doctor Joseph Lovell. The evolution of the Medical Department into its present form has been based upon necessity and upon the constantly increasing need for its growth and development, the periods of the greatest development corresponding to the major military activities of the United States Government.

The National Defense Act of 1916 as subsequently amended, provides that the Medical Department shall consist of one Surgeon General with the rank of Major General, four assistants with the rank of Brigadier General, one of whom shall be an officer in the Dental Corps; the Medical Corps, the Dental Corps, the Veterinary Corps, the Medical Administrative Corps, the Army Nurse Corps and a number of enlisted men not to exceed 5 percent of the actual commissioned and enlisted strength of the Regular Army. In addition, there is provided, in the Reserve only, the Sanitary Corps as a part of the Medical Department.

The Medical Corps is the commissioned component of the Medical Department, composed of graduate physicians of Class A Medical Schools who have completed one year of accredited internship.

The Dental and Veterinary Corps are the commissioned components of the Medical Department consisting of graduate dentists and veterinarians, and the Medical Administrative Corps is composed of non-professional officers who are appointed to assist in the administrative affairs of the Medical Department in such capacities as Medical Supply Officers, Registrars, Detachment Commanders, Mess Officers, Adjutants, etc.

The Army Nurse Corps consists of female nurses having the administrative rank of officers in grade from Second Lieutenant to Major.

The Sanitary Corps includes chemists, bacteriologists, sanitary engineers, food and nutrition experts, non-medical public health workers, and non-professional men experienced in the procurement, storage and distribution of medical equipment and supplies. Men of these qualifications may be commissioned in the Sanitary Corps Reserve of the Medical Department. They are assigned to appropriate duties in their special fields such as the supervision of water purification and sewage treatment plants, sanitary surveys, nutritional studies and some may be assigned as laboratory officers.

The mission of the Medical Department is the preservation of the strength of the Army by conservation of military man power in the following manner:

(1) By the selection, through properly conducted physical examinations, of only those men physically fit for military service.

(2) By keeping such personnel in good physical condition by application of the modern principles of preventive medicine.

(3) By furnishing those who do become disabled with such aid in the form of evacuation and hospital facilities as will speedily restore them to health and fighting efficiency.

Because of the fact that we have never been a military nation, our Regular Army has always been relatively small. For example, on July 1, 1939, it was 17th in size among the nations of the world, and consisted at that time of 174,000 enlisted men and 13,000 officers. Of the latter 1,200 were members of the Medical Corps, that is, doctors of medicine. By the time that war was declared, on December 8th, 1941, the Army expanded nearly ten-fold, with a corresponding increase in the strength of the Medical Department. As further expansion of the Army takes place, the need for medical officers will naturally increase, the number required being dependent upon the increase in the size of the Army, as in a general way the allowance of medical officers is roughly 6.5 per 1000 of military population. While this allowance may seem excessive when one compares this ratio with that generally allowed for civilian communities, one must realize that the responsibilities and activities of the Medical Department extend far beyond the mere treatment of sick and wounded, and that carrying out the mission of the Medical Department is a much more complex task than might be thought.

The responsibilities of officers in the Medical Corps are much broader than those of the physician in civil life. They include field medical service, the operation of many types of hospitals, ambulance service, medical supply, preventative medicine and the training and command of large numbers of Medical Department enlisted men assigned to their units.

In modern civilian communities, the health of the population is cared for by hospitals, practicing physicians and dentists, health departments and numerous permanent sanitary installations. To provide properly for the health of the military, the Army Medical Department utilizes its own hospitals, dispensaries and laboratories, practices preventative medicine and engages in other activities to provide service for the sick and injured and to establish and maintain sanitation in the Army.

Satisfactory solution of this problem requires trained medical personnel to take over these responsibilities and those incident to the increased disease hazards occasioned by military life, both in cantonment and during operations in the field.

Service in the Medical Department may be roughly divided into service with a field or tactical unit, and

* Read at the National Assembly of the International College of Surgeons, Denver, July, 1942.

service with a mobile or fixed hospital or Medical Department installation of the line of communications and zone of the interior.

With the tactical units is included medical personnel attached to the Infantry, Cavalry and Artillery regiments of a Division, which is commanded by the senior medical officer who is known as the Regimental Surgeon. In addition, there is with each Division a Medical Battalion which is charged with the prompt care and evacuation of the non-effective sick and injured from all units of the Division which it serves.

In addition, the Medical Service of the Army includes the Army Surgeon and his assistants and the following medical units:

Medical Regiments, Surgical, Evacuation and Convalescent Hospitals, Medical Supply Depot and Laboratory.

ARMY MEDICAL REGIMENT

The Army Medical Regiment furnishes medical service to Army troops not otherwise provided for, and supports and reinforces the medical service of the Divisions assigned to the Army.

There are three Medical Regiments provided for each type Army, each consisting of 66 officers and 980 enlisted men. The Army Medical Regiment is charged with the collection, evacuation, temporary care, sanitation and medical supply in the Division area to which assigned. It provides the evacuation of patients from the clearing stations to evacuation hospitals.

THE SURGICAL HOSPITAL

Surgical hospitals are allotted at the rate of eight per type field Army and have a capacity of 400 patients each. They are mobile units and furnish special facilities for the immediate surgical aid of the more serious types of casualties. They are assigned to the immediate support of Division clearing stations from which they receive the non-evacuable or other serious cases, thereby freeing the clearing station for movement. When once established, a Surgical Hospital remains in operation until the patients it has received are fit for evacuation. When evacuable, their patients are transported, usually by ambulance, to Evacuation Hospitals established in the rear.

The Surgical Hospital is organized into a mobile, self-contained surgical unit, available for reinforcing any other hospital unit within the Army, and two hospitalization units, capacity of 200 each.

The mobile surgical unit consists of 14 officers, 6 nurses and 35 enlisted men and includes 2 surgical, 1 splint, 1 shock and 1 maxillo-facial team.

Each hospitalization unit consists of 17 officers, 27 nurses and 118 enlisted men, making a total strength for the Surgical Hospital Unit of 50 officers, 60 nurses and 275 enlisted men, commanded by a Colonel of the Medical Corps.

THE EVACUATION HOSPITAL

The Evacuation Hospital which is also an Army Unit, is the next in the chain of evacuation. This is a mobile hospital that has a capacity of 750 patients and constitutes the "neck of the funnel" through which all casualties pass in their transit out of the combat zone, to the fixed hospitals of the communications zone. It is a compact unit that can be transported, shelter and all, by motor truck convoy, and should be able to establish and receive patients within five hours of its arrival at its selected site.

There are 10 evacuation hospitals provided in each type Army, each consisting of 47 officers, 52 nurses and 318 enlisted men and commanded by a Colonel of the Medical Corps. The Tables of Organization provide for a Chief of the Surgical Service, with 3 surgical, 2 splint, 2 shock, 1 maxillo-facial, 1 neurosurgical and 1 thoracic surgical team.

The mission of the Evacuation Hospital is as follows: (a) To provide as near the front as practicable, facilities for major medical and surgical procedures in the treatment of casualties; (b) To provide definitive treatment as early as practicable and to relieve combat troops of the burden of casualties; (c) To provide facilities for concentration so that mass evacuation by rail, motor or water transport can be undertaken economically; and (d) To remove from the chain of evacuation such casualties as are, or soon will be, fit for duty.

THE CONVALESCENT HOSPITAL

The Convalescent Hospital is established for the purpose of receiving from evacuation hospitals, convalescents and cases which will soon be ready for return to the front line.

It has a capacity normally of 3,000 patients which may be expanded for short periods to 5,000, and has an allotted personnel of 28 officers and 189 enlisted men.

There is one convalescent hospital provided for each type Army which is established in the rear of the Army Area, preferably adjacent to an Evacuation Hospital.

THE ARMY MEDICAL LABORATORY

The Army Medical Laboratory consisting of 11 officers and 45 enlisted men conducts epidemiological investigations, surveys and studies, and provides the necessary laboratory work, including water analysis, for the Army.

There is also provided an Army Medical Supply Depot to provide medical supplies for the medical units of the Army. It normally is stocked to maintain combat efficiency for a period of three days.

The hospitals that we have considered thus far have been referred to as mobile units. There are additional hospitals which may be classed either as fixed or mobile. Fixed hospitals may be of permanent or temporary construction and usually remain in the same site for the duration of the war, and for an indefinite period thereafter.

The mobile hospitals are intended primarily for use with field forces in combat zones of theatres of military operations.

Fixed hospitals are classed as either General or Station and are established in the Communications Zone or Zone of the Interior. It is contemplated that in the Zone of the Interior, General Hospitals be maintained to care for approximately 1 percent of our total military population, while the Station Hospitals in this area are provided to accommodate 4 percent. In the Theatre of Operations, the number of beds to be maintained in General Hospitals is dependent upon the nature of the tactical operation and it may be necessary at times to provide bed capacities totalling 12 to 15 percent of the troops engaged. The Station Hospitals in the Zone of Interior vary in size from the capacity of 25 to 2,000 beds, while General Hospitals vary from approximately 500 to 3,000 beds.

The General Hospitals which are established in the Zone of the Interior will be given appropriate names as recommended by the Surgeon General and will be known as the "named general hospitals," such as Fitzsimons General Hospital. The General Hospitals

which are located in the Communications Zone are designated and identified only by their number, such as the 29th General Hospital.

The named General Hospitals are established and maintained to afford better facilities than ordinarily can be provided for the observation, treatment and disposition of complicated or obscure cases, and for the performance of the more serious surgical operations. In general, it has been the policy of the Medical Department to treat as general hospital cases all patients who require more than ninety days hospitalization, as well as those cases requiring specialized treatment which is not available at Station Hospitals. Before the emergency, fixed permanent general hospitals in the United States were the following: Walter Reed General Hospital in the District of Columbia; William Beaumont General Hospital at El Paso, Texas; Army and Navy General Hospital, at Hot Springs, Arkansas; Letterman General Hospital, at San Francisco, California; and Fitzsimons General Hospital, in Denver. In addition, the Station Hospital at Fort Sam Houston, Texas, though not a named General Hospital, has always operated as such.

A General Hospital was also provided for the Philippine Department, namely, Sternberg General Hospital at Manila, and for the Hawaiian Department, Tripler General Hospital in Honolulu.

During 1941, nine additional named General Hospitals of temporary construction were provided, and there are under construction at the present time 15 additional named General Hospitals which will in all probability be in operation within the next three months.

The present numbered general hospitals of 1,000-bed capacity have a quota of 56 officers, 105 nurses and 500 enlisted men. Of the 56 officers, 39 are members of the Medical Corps, 5 Dental, 7 Medical Administrative, 2 Chaplains, 2 Quartermasters and 1 Sanitary Corps officer.

The number of these hospitals to be established in the Communications Zone is dependent upon the expected demand and the policy of evacuation from the Theatre of Operations to the Zone of the Interior.

Three or more general hospitals may be grouped together to form a Hospital Center and during the last war we had several such installations which had a capacity of 20,000 beds.

The Station Hospitals which are established in the Zone of the Interior derive their identification from their location, for example, Station Hospital, Camp Carson, Colorado, while those which are located in the Theatre of Operations are numbered just as are the General Hospitals.

A numbered Station Hospital has a capacity of 250 patients and a staff of 20 officers, 30 nurses and 150 enlisted men. It operates in the Communications Zone whenever the number of troops in the areas justifies its establishment, but does not ordinarily receive patients from the combat zone.

There is an additional unit in which I think you are particularly interested, namely, the Auxiliary Surgical Group, and, as its name implies, this Unit is made up of medical officers qualified as operating surgeons. This unit is held in the Communications Zone and surgical teams are sent forward when required to reinforce Surgical, Evacuation and General Hospitals in times of stress.

The Table of Organization for an Auxiliary Surgical Group provides a complement of 128 officers, 70 nurses and 127 enlisted men and provides 24 surgical, 6 splint, 6 shock, 6 gas, 4 maxillo-facial, 4 neurosurgical, 4 thoracic surgical and 4 miscellaneous surgical teams.

Many of the numbered Surgical, Evacuation and General Hospital Units have been sponsored by civilian hospitals and by medical schools and are known as Affiliated Units. Officers belonging to such units are encouraged to apply for active duty training at general hospitals with the view to obtaining the necessary military training to qualify for their assignment in their Unit. When the Affiliated Unit is activated, these officers will be returned to their parent organization.

The duties of medical officers in Surgical Evacuation and General Hospitals will not differ markedly from those in civil life. However, the types of patients do differ greatly. Military personnel is a select group of young men in good physical condition and, therefore, cases which are not battle casualties will largely be of an acute, rather than of a chronic nature, and inflammatory, rather than degenerative. In addition, many patients who are treated in their homes in civil life must necessarily be admitted to Army hospitals as a sick soldier cannot be taken care of in his barracks. This fact accounts for the larger bed capacities required in Army installations.

In order to understand how the different organizations of the Medical Department function, it might be of value to discuss briefly a schematic evacuation of a wounded man from the front line to the rear. When a soldier is wounded, he is first taken care of by a company aid man who is an enlisted man of the Medical Department, who quickly examines him, applies an emergency dressing and determines whether he can walk or must be transported to the rear. If he can walk, he is directed to the Battalion Aid Station which is situated immediately behind the front line and is established to prepare casualties for evacuation further to the rear. If he is unable to walk, he is transferred to this station by litter bearers belonging to the Regimental Detachment. The Battalion Aid station is in charge of a medical officer. Bandages and splints are inspected and adjusted, hemorrhage controlled and morphine given if necessary. From this point the patient is transported to the Collecting Station, either by litter carry or by ambulance, depending upon the nature of the action. The Collecting Station is larger and more elaborate than the Battalion Aid Station, and is more fully equipped to combat shock. The casualty is then transported by ambulance to the Clearing Station, where he is critically examined and classified.

From the Clearing Stations, those cases which require further hospitalization and are transportable, are evacuated by ambulance companies furnished by the Medical Regiment of the Army, to the Evacuation Hospital in the rear. Non-transportable wounded such as head, chest and abdominal conditions are diverted to the mobile surgical hospital.

The Mobile Surgical Hospital is established in the vicinity of the Clearing Station to take care of that group of patients who require immediate surgery. The personnel of the Mobile Surgical Hospital is supplemented by one or more teams from the Auxiliary Surgical Group when such action is deemed necessary by the Army Surgeon.

The function of the Evacuation Hospital is to give emergency surgical aid, and while facilities are available for post-operative care, the patient is transported as soon as possible to the General Hospital where definitive treatment is carried out. Transfer of cases from the Evacuation Hospitals to General Hospitals

of the Communications Zone is made by hospital train or boat, the evacuation being controlled by regulating stations which have at all times reports of the available beds in the Communications Zone.

As previously mentioned, there is established in the vicinity of the Evacuation Hospital a Convalescent Hospital for the reception of such cases as will soon be available for full duty and return to the front.

The disposition of patients from the General Hospitals in the Communications Zone is either to convalescent camps or to reclassification centers with a view to return to duty with the combat forces, or if they are permanently disabled, they are evacuated to General Hospitals in the Zone of the Interior.

Frequent reference has been made to the different zones of military activity and some explanation seems to be in order. A military force in time of war is disposed in three parts, the Combat Zone, the Line of Communication and Zone of the Interior. The Combat Zone and the Line of Communication combined constitute the Theatre of Operations, while the Zone of the Interior, usually the home territory, furnishes to the Theatre of Operations, munitions, supplies and men required and assumes the care of non-effectives from that area. In the first world war the division into these zones was simple—France was the Theatre of Operations and the United States was the Zone of the Interior.

The fate of the wounded soldier depends upon the skilled care from the moment he first receives his wound. Skilled first-aid care and proper handling are even more vital than surgery at a later date and it is, therefore, essential that young medical officers assigned to medical detachments and medical battalions be qualified and trained in the handling of all manner of medical and surgical emergencies; he must receive adequate training with his organization so that when the moment of combat arrives, he is prepared to play his part in the military operation. He must minimize deaths from shock and hemorrhage, prevent disabling after results from wounds and deliver patients to the hospital units in the rear, in the best possible condition.

I would like to discuss briefly the training program of the Medical Department for commissioned and enlisted personnel. In normal times, this training was conducted at the Medical Department Service Schools located at the Army Medical Center in Washington and the Medical Field Service School at Carlisle Barracks, Pennsylvania. The Army Medical Center, including the Walter Reed General Hospital, the Army Medical, Dental, Veterinary School, and the Army School for Dietitians and Physical Therapy Aides, conducted postgraduate courses of instruction for Regular Army medical, dental and veterinary officers and also gave special courses for enlisted men to qualify them as technicians for Medical Department installations.

The Medical Field Service School at Carlisle Barracks was established to teach medical military tactics and administration, to instruct and train Medical Department officers in field service and to instruct and train selected enlisted men of the Medical Department in the duties of non-commissioned officers.

Because of the national emergency, it was necessary to modify the normal schedule of instruction at the established Schools and to provide additional training facilities for officers and enlisted men, under the following procedures:

Officers who are to be assigned to hospital units may be ordered to general hospitals as members of the Medical Department Replacement Pool for training in their specialty or contemplated assignment. Such courses of instruction may be for periods from one to four months and, in addition to the professional training, include a short course of instruction in the basic administrative principles peculiar to military service.

Officers who are to be assigned to tactical units may be ordered to the Medical Field Service School or Medical Department Replacement Training Centers where they are given an intensive course in Medical Department administration and field duties of medical detachments assigned to combat units.

Special courses of instruction in tropical medicine and maxillo-facial surgery are conducted at the Army Medical School in Washington, D. C. In addition, it is planned that officers will be assigned for brief courses of instruction in the various specialties such as orthopedic surgery, neurosurgery, thoracic surgery, plastic and maxillo-facial surgery. These courses will be conducted at various civilian institutions throughout the country.

The Medical Department enlisted men are first assigned to Medical Replacement Training Centers which have been established at Camp Pickett, Virginia, Camp Grant, Illinois, Camp Barkeley, Texas, and Camp Robinson, Arkansas. At these centers they receive their basic military training and at the same time are given instruction concerning Medical Department Field Units and installations. Especially selected educationally qualified enlisted men are sent from the Replacement Training Centers to one of the Medical Department Technicians' Schools which have been established at nine of the General Hospitals in the United States. The courses of instruction at these Schools cover a period of from two to three months and are for the purpose of providing laboratory, x-ray, dental, pharmacy, medical and surgical technicians for assignment to Medical Department Units.

One of the first Medical Department Technicians Schools was opened at Fitzsimons General Hospital on April 1, 1941 and during the period of operation to July 1, 1942, graduated a total of 3,318 technicians. The ten Schools which are in operation at the present time have a maximum monthly output of approximately 3,000 technicians.

I realize that this has been a very sketchy outline of the functions of the Medical Department, but I hope that it has given you at least some idea of the problems with which we are confronted. Our task is not an easy one. Already heavy demands have been made on the civilian medical profession and from present indications, these demands will increase tremendously. There is no doubt that the medical profession will respond with the same determination and courage as it did in 1917 and that every American soldier will receive the adequate medical and surgical care to which he is entitled.

Editorials

Wound Healing—Hypoproteinemia

THE scientific spirit of surgery was created by John Hunter and carried to all parts of the globe by his pupils and writings. Since the rediscovery of bacteriology and anesthesia in the Nineteenth Century, experimental surgery has solved many important questions on tissue growth and repair. The healing of a wound occurs by fibroplasia originating in and from resting, relatively undifferentiated cells closely related to the mesoblast, and fibroblasts which are differentiated into a specific adult tissue. Wound healing is disturbed by systemic changes and local healing is delayed by a retardation of fibroplasia as a result of excessive exudative reaction. Tissue necrosis, infection or foreign bodies also delay the onset of fibroplasia.

Tissue growth is greatly influenced by the character of the food. Osborne and Mendel, in 1914, were of the opinion that "obviously the relative values of the different proteins in nutrition are based upon their content of those special amino acids which cannot be synthesized in the animal body and which are indispensable for certain distinct, as yet not clearly defined, processes which we express as maintenance or repair," and demonstrated that vitamins are of fundamental importance. Whipple and Hooper have shown that "regeneration of blood by the bone marrow is much influenced by the character of the food."

Wolbach, experimenting with vitamins A, C and D, showed that "a number of problems involving cells and tissues primarily affected by vitamin deficiencies can be made easier of approach by making use of the fact that we can retard, suppress and release at will some tissue activities, including growth of cells, source, maintenance and formation of intercellular materials, calcification of bone and cartilage and compensatory hyperplasia."

Clark found healing of wounds began more promptly on a protein-rich diet than a diet composed chiefly of fats and carbohydrates, although when once begun the rate of healing is the same.

Rose, in 1934, stated: "When a mixture has been devised, the composition of which is determined by the physiologic need for each essential, the quantity of nitrogen required for the maintenance of the organism may prove to be surprisingly small. Indeed, it is not wholly improbable that methods may be devised whereby this ideal mixture may be employed for parenteral administration to human subjects when the prevention of undue loss of body structures is an important consideration. The maintenance of nitrogen equilibrium, even for

relative short intervals in patients who are temporarily unable to receive food orally, is important."

Du Noüg, in 1936, demonstrated that a "child of ten cicatrizes five times more quickly than a man of sixty."

The writer reported before the Wisconsin Academy of Surgery in 1938 the disruption of abdominal wounds in 0.66 per cent of intraperitoneal operations performed between January, 1932, and December, 1935. All patients for major elective operations have been hospitalized at least forty-eight hours before operation during the past fifteen years. Alcohol, ether and tincture of metaphen have been used routinely as a disinfectant for ten years. Contamination of the wound was encountered in only three cases. The body fluids and nutrition were maintained by the intravenous use of blood, blood plasma, normal saline and glucose solutions (5 per cent), until fluids were tolerated orally.

The Muether method of preparing blood plasma enables all hospitals to maintain a plasma bank for the treatment of hemorrhage, shock, hypoproteinemia, etc. Blood plasma or serum is a valuable substitute for direct blood transfusion. In debilitated cases sufficient blood or blood plasma is given to maintain a normal protein balance. With their use only one case of disruption of the abdominal wall occurred since January, 1936.

The prevention of intra-abdominal pressure by the use of a negative suction tube in the stomach and duodenum, first used by Edme Mariotte (French physician and physicist, who died in 1684) and popularized by Wangensteen, is of inestimable value.

Other important contributions to the field of surgery have been made during the past five years. Chemotherapy in contaminated wounds and as a preventive has proved itself a valuable aid.

W. J. Carson, M.D.

The Use of the Cutis Graft in General Surgery

THE use of cutis graft material incidental to various types of surgical reconstruction possesses great merit. To begin with, a cutis graft is a piece of whole thickness skin from which the epidermal layer has been cut away. This constitutes living autoplastic repair material. The indications for its use are almost legion. When implanted in the body under ordinary aseptic surgical conditions the "takes" are practically 100 per cent. The repair made, when properly sutured in place, has strength quite fully equal to the lost or damaged structures that it replaces. The indications are any of the conditions for which fascia has ever been successfully used, only it is greatly superior to the former in every way. The closure of otherwise inoperable defects in the abdominal wall is made simple, easy and relatively certain. It is quite ideal and permanent for joint lining in arthroplasties. The uses are many and varied

for replacement purposes, such as a substitute for destroyed dura; the reconstruction of damaged tendon; the reinforcement of weakened ligaments; autoplastic suture material whenever and wherever needed; for filling out defects of contour about the head and face. Two or more thicknesses may be used whenever indicated.

The technic of cutis graft implantation, briefly, is as follows: After the epidermal layer has been removed with a skin graft knife, the properly outlined graft shall be sutured into position, preferably on stretch; it is then covered over in such a manner that dead space will be obliterated as nearly as possible; all sutures underneath the skin shall be of the buried type; no drains are used.

The functional stress that is required of the graft apparently promotes conversion into the type of tissue that has been replaced. Grafts can be expected to heal in place even in spite of mild wound infections. Cotton thread sutures and a sulfanilamide-sulfathiazole technic have been used in a series of 37 consecutive cases without the loss of a single graft.

The greatest value for the method is in the treatment of large incisional hernias, the strength of the properly sutured graft being such that the patient may be up daily subsequent to the day of operation.

John E. Cannaday, M.D.

Prognosis In Prostatic Carcinoma

THE problem of carcinoma of the prostate has been given considerable impetus of a hopeful character by the recent work of Huggins and his collaborators on the relation of the prostate to the various endocrines, and especially to the sex hormones. These workers assumed that prostatic carcinoma, being composed of mature epithelial cells, might be responsive to a depression of the androgenic hormones in the body, in common with all other types of adult prostatic epithelium. Using the phosphatase estimation as a method of objective proof, they found that androgen injection caused a marked rise of acid phosphatase in men with prostatic carcinoma, and that castration or estrogen (female sex hormone) injection produced a sharp advance in the activity of the phosphatase.

Following publication and further study of this important work, orchidectomy has been performed in many cases, and in some instances with results which Quinby terms "quite phenomenal" (*New England J. Med., Oct. 1, 1942*). The most striking benefit, he adds, was the relief of metastatic conditions; in several cases, patients partially paralyzed by pressure on the spinal cord and nerve roots, were freed from pain and were again able to walk. While it is generally acknowledged that orchidectomy (first suggested by J. W. White in 1893) does not result in total resolution of the cancer in the pros-

tate itself, there is no doubt that this procedure relieves many of the most prostrating symptoms induced by the prostate and metastases.

Urologists are slowly but definitely giving up their defeatist attitude toward prostatic cancer, as the result of these recent studies. There is considerable evidence of the excellent results which follow the total removal of the gland by the perineal route. Recent reports are highly encouraging in cases in which the diagnosis has been made sufficiently early. These reports indicate that cancer of the prostate is often curable if the growth is radically removed in time to prevent extensive metastasis.

The rôle of transurethral resection in prostatic cancer seems to be not well defined. Concededly, the cancerous growth is not removed by this procedure. While some eminent urologists speak of resection as a great boon, others declare that it encourages the spirit of defeatism and although the immediate mortality of the operation is small, Vallett states that it "reaps a toll of morbid cancer sufferers, many of whom could be saved by the radical operation" (*Delaware Med. J., July, 1942*).

A course of treatment of patients with prostatic carcinoma is suggested by Quinby as follows: "For patients with few or no urinary symptoms, but with an amount of carcinomatous invasion too extensive to permit total prostatectomy, castration, followed by diethylstilbestrol is advised; for those with obstructive symptoms and a degree of malignant invasion too extensive for total prostatectomy, transurethral resection, combined with castration, is preferred; in patients for whom total prostatectomy can be done, but who already have metastases, prostatectomy, followed at least by stilbestrol, and possibly by castration if the acid phosphatase remains high, should be performed; patients amenable to radical excision of the gland should have operation, followed by careful observation of the phosphatase readings, castration being reserved until high values of this enzyme indicates its need."

There is good reason to believe that, with the early detection of the carcinomatous prostate by rectal examination in men over 50, as an important part of an annual physical examination, and with due regard for the merits of prostatectomy, orchidectomy and transurethral resection in suitable cases, the outlook for the cancerous prostatic patient has become more encouraging than it has been up to this time.

A. L. Wolbarst, M.D.

BOOK REVIEWS

Rectitis Infiltrativa. By Manuel Riveros, M.D., Professor of Clinical Surgery, and Julio Manuel Morales, M.D., Professor of Clinical Gynecology, University of Asuncion. Editorial "El Pais," Asuncion, 1939.

IN THIS very clear and concise monograph the authors review the etiology, pathogenesis and clinical manifestations of a disease which knows no boundaries and is most ravaging in its effects. Because this disease, more familiarly known to us as lymphogranuloma inguinale, or venereum, is bound to spread because of the war, the authors should be complimented for their timely warning that every rectal case presenting inflammatory strictures, with ulcerations, fistulas, suppuration and edema must receive the Frei test routinely. In submitting a summary of their observations on 16 cases with a positive Frei test, they discuss the results of their treatment of each case and conclude that it is rather unsatisfactory.

The authors express their opposition to radical surgery, but justify palliative surgery in the exceptional cases complicated by acute obstruction, persisent hemorrhages, etc. Their treatment is based mainly on intravenous injections of tartar emetic and Fuadine, associated with antiseptic irrigations and electro-coagulation. It is unfortunate that they do not mention their experience (if they had any) with the sulfonamide compounds, local and systemic, on which other authors have reported favorably. Their references to the literature are well chosen, but here again it is unfortnate that they have omitted the findings of Rickettsia organisms in a number of cases by Miyagawa in 1935, and by Nauck and Mauro in 1937. Because of the importance of this disease, this book should be read by everyone familiar with Spanish.

A. R. LARRAIN.

Aftereffects of Brain Injuries in War. By Kurt Goldstein, M.D., Clinical Professor of Neurology, Tufts Medical School. With a foreword by D. Denny Brown, M.D., Professor of Neurology, Harvard Medical School. 244 p., 46 fig. Grune and Stratton, New York, 1942.

THIS book is based on the author's experience with the care during and following World War I of a large number of soldiers suffering from brain injury. The organization of hospitals in Germany following that conflict, specializing in the care of soldiers with brain injuries, is of great practical interest at the present time. The book is written from the standpoint of the neuro-psychiatrist and is concerned principally with the late neurologic and psychiatric symptoms of brain injury and with the problem of rehabilitation of these unfortunate patients. The detailed account of the psychologic laboratory examinations and of the treatment of circumscribed mental defects, particularly visual agnosia and various speech disturbances, is of great interest and very illuminating.

The author emphasizes the complex and difficult nature of the problem of caring for men suffering from brain injury in war and the special organization of facilities, as well as special skill and devotion that are required to adequately care for these patients. He well emphasizes that from a purely economic point of view the results may not equal the time and effort expended, but, to quote: "We should never forget that we are dealing with young men crippled for life by the impairment of man's most precious capacity, the power of the mind, while serving their country and fellowmen." Therefore, whatever is accomplished in the way of social and economic rehabilitation is well worth the expenditure, no matter how great. This book should be read by everyone who is concerned with the care of patients who have suffered injury to their brains.

HAROLD C. VORIS.

Fractures and Dislocations Covering Their Pathology, Diagnosis and Treatment. By Kellog Speed, S.B., M.D., F.A.C.S. 1,140 fig. 4th Ed., Lea and Febiger, Philadelphia, 1942.

THIS excellent text consisting of 1,100 pages, with a comprehensive index, is one which should be in the library of every physician and surgeon who attempts to treat fractures and dislocations. The text is divided into 24 chapters covering the immediate treatment of fractures, the healing stages of fractures and dislocations, and the various phases thereof.

The first chapter is valuable because it includes many pertinent suggestions concerning the apparatus to be used, methods of splinting, types of fixation dressings, ambulatory splints, massage and allied treatment. The second chapter gives the answers, when to operate and when not to operate, with many valuable suggestions on various types of traction methods which will be helpful in this line of work. The third covers most of the different dislocations, the terminology of the various degrees and types of dislocations with explanations, and the accompanying pathology is not overlooked. The fourth discusses the various types of skull fractures and includes their pathology, symptomology and treatment. The fifth has some valuable suggestions concerning treatment of fractures of the bones of the face and dislocations of the lower jaw. The sixth takes up fractures and dislocations of the vertebræ and gives the salient points covering fractures of each vertebra in the spine.

The possible injuries to the cord, together with the technicality of laminectomy, etc., are discussed in Chapter 7. Strange as it may seem, this chapter devotes 32 pages to the various fractures and dislocations of the clavicle and their treatment. Chapter

8 discusses fractures of the scapula and is abundantly covered with line tracings. The ninth covers fractures and dislocations of the ribs and does not omit trauma of the costal cartilages. The tenth is interesting because it describes fractures and dislocations of the hyoid bone, sternum and the laryngeal and tracheal cartilages. The eleventh is well worth reading, as it covers the many problems presented by fractures of the humerus. The illustrations in this chapter are very helpful and abundant. In Chapter 12 the author devotes considerable attention to dislocations about the shoulder girdle and clearly describes several operative methods or the habitual and recurrent dislocations of the humerus. Chapter 13 is interesting as it deals with fractures of the forearm bones. The author's simple language and accompanying illustrations are helpful.

Dislocations of the elbow are well covered in Chapter 14, and one of the most interesting parts of the book is the treatment of the problem of fractures of the carpal, metacarpal and phalangeal bones, as described in Chapters 15 and 16. Chapter 17, covering fractures and dislocations of the pelvis, and Chapter 18, describing the anatomy and the treatment of fractures of the femur, are very complete. They should be read with Chapter 19, which treats dislocations of the hip. Chapters 20, 21 and 22 deal with fractures of the patella, lower bones of the leg and dislocations of the knee. Many helpful suggestions concerning the treatment of fractures of the bones of the foot and dislocations of the ankle and foot are found in Chapters 23 and 24.

An abundance of references is found at the end of each chapter which makes this a valuable reference as well as a textbook. It shows a marked amount of preparation and painstaking care in assembling the material used in this excellent book.

HORACE E. TURNER.

Principles of Neurological Surgery. By Loyal Davis, M.S., M.D., F.A.C.S., Ph.D., D.Sc. (Hon.), Professor of Surgery and Chairman of the Division of Surgery, Northwestern University Medical School. 2nd Ed., 503 p., 298 fig., 154 engr., 5 col. plates. $7. Lea & Febiger, Philadelphia, 1942.

THE author's first book published in 1936, is familiar to all students of neurologic surgery. It has also been of great value to those interested in this topic but who do not specialize in it. His new book may be said to almost completely overcome the shortcomings of the first edition. This has been accomplished by adding many valuable illustrations and by going into more detail on some of the subjects which are of vital importance to the problem of neurosurgery.

It may be said that the present edition is a well rounded expose of this subject, but largely from a diagnostic point of view rather than from that of surgical technic. However, it well accomplishes this purpose, as the author states in the preface that it is intended for the physician and the student rather than the specialist. There is no doubt that it is much more valuable because it is presented in such a manner that most anyone with a good medical education can understand the problems explained. This book is highly recommended to those who are interested in this subject and who are not concerned with technical surgical details.

RUDOLPH JAEGER.

Carcinoma and Other Malignant Lesions of the Stomach. By Waltman Walters, B.S., M.D., M.S. in Surgery, D.Sc., F.A.C.S., Surgeon, Mayo Clinic; Howard K. Gray, B.S., M.D., M.S. in Surgery, F.A.C.S., Surgeon, Mayo Clinic; James T. Priestley, B.A., M.D., M.S. in Experimental Surgery, Ph.D. in Surgery, F.A.C.S., Surgeon, Mayo Clinic; and Associates in the Mayo Clinic and Mayo Foundation, Rochester, Minn. 576 p., 143 illus. $8.50. W. B. Saunders Co., Philadelphia and London, 1942.

THIS work is timely, instructive, and illuminating. It springs from an authoritative source. It evaluates all cases of malignant disease of the stomach observed at the Mayo Clinic from 1907 to 1938. The group comprises 11,000 patients. Of these cases, 6,352 underwent operations in which there were 2,840 where the stomach was resected. Ninety-nine per cent proved to be carcinoma; 1 per cent lymphosarcoma, fibrosarcoma or Hodgkin's disease. The work is divided into 23 chapters and contains an appendix and a good, well balanced index. There is a splendid chapter on roentgenology by Kirklin, who emphasizes that by meticulous attention to detail diagnosis of gastric lesions can be made in almost 100 per cent of the cases. The difficulty is in the differential diagnosis between carcinoma and ulcer. In considering surgical interference, the questions of operability and resectability are, of course, of utmost importance, and here the X-ray is a great aid in arriving at conclusions. Digital examination of the rectum is advocated in every suspected case of carcinoma of the stomach to ascertain the presence of affected lymph nodes at Blumer's rectal shelf. In doubtful cases, biopsy of Virchow's node is advised. The chapter on anesthesia is very thorough. It comprises about fifty pages. To avoid post-operative pulmonary complications, aspiration of bronchial contents is stressed. Pólya is still given credit for the method which is designated by his name. Reichel implanted the open stomach into the jejunum in 1908; Pólya described the same operation in 1911. There still is no unanimity among surgeons as to what procedure is best in gastric resection. Many are very partial to the Hofmeister operation, while the authors do not recommend this procedure. Postoperative care is described very thoroughly. The authors recommend fluid by proctoclysis. They state that in this manner, from 2,000 to 2,500 cc. can be given daily with little discomfort. Venoclysis is not recommended as a routine procedure. A fine chapter on prognosis and end-results is included. All in all, this excellent work can be highly recommended. Malignant lesions of the stomach are presented in the various aspects (medical, surgical and roentgenologic); final results obtained from various studies are voluminously yet succinctly tabulated (100 pages of tabulated material). A close study of these tables discloses the survival rates of the various surgical entities discussed, etc. The importance of co-operation between the various medical groups is stressed. The operative procedures are well described and well illustrated. Printing and binding are good. Since carcinoma of the stomach has created a great deal of investigative interest in all quarters, the work is timely and should find its way to all medical shelves.

M. T.

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THE JOURNAL OF THE INTERNATIONAL COLLEGE OF SURGEONS

Index, Volume V, January-December, 1942

By Titles and Authors

Index of Articles

Abscesses, tuberculous cervical, with skin involvement, open surgical treatment of (Bailey), (Sept.-Oct.) 375
Albee, F. H.: Immobilization by surgery of osseous and pulmonary tuberculosis (Jan.-Feb.) 10
Albee's odyssey, Fred H. (Sept.-Oct.) 428
Allen, F. M., Crossman, L. W., Hurley, V., Warden, C. E., and Ruggiero, W.: Refrigeration anesthesia (March-Apr.) 125
Allende, J. M., and De Goycoechea, O. L.: Tratamiento de la pancreatitis aguda (Jan.-Feb.) .. 19
Anderson, R.: Castless ambulatory method of treating fractures (Nov.-Dec.) 458
Anesthesia, pentothal sodium intravenous (Rudder), (Jan.-Feb.) 69
Anesthesia, refrigeration (Allen, Crossman, Hurley, Warden and Ruggiero), (March-Apr.) 125
Aneurysms, intracranial, of internal carotid artery and its branches (Hamby), (May-June) 216
Ano-rectal localizations of the Nicholas Favre or fourth venereal disease, contribution to surgical treatment of (Borjas), (Jan.-Feb.) 50
Arnold, C. H., and Gibson, L. V.: Modification of Smith-Peterson pin (Mar.-Apr.) 180

Bailey, H.: Open surgical treatment of tuberculous cervical abscesses with skin involvement (Sept.-Oct.) 375
Barraquer suction cataract operation, modified (Blaess), (March-Apr.) 165
Bates, W., and Judovich, B. D.: Scalenus anticus syndrome (Jan.-Feb.) 26
Behrend, A.: Some surgical problems of present war (July-Aug.) 308
Behrend, A., Behrend, M., Custer, E. W., and Gorman, H. A.: Changing pattern of collapse therapy in treatment of tuberculosis (Jan.-Feb.) 33
Biliary surgery, recent developments of (De Muth), (Nov.-Dec.) 481
Biliary tract, objections in surgery of (Douglas), (March-Apr.) 135
Bladder, neurogenic, therapy of (Voris and Landes), (May-June) 206
Blaess, M. J.: Modified Barraquer suction cataract operation (March-Apr.) 165
Blood volume in thrombo-angiitis obliterans, effect of sympathectomy on (Rachmilewitz and Wolman), (Jan.-Feb.) 80

BOOK REVIEWS

Abdominal Surgery of Infancy and Childhood. Wm. E. Ladd and Robert E. Gross (March.-Apr.) 181
Aftereffects of Brain Injuries in War (Goldstein), (Nov.-Dec.) 534
Approved Laboratory Technic (Kolmer and Boerner), July-Aug.) 361
Biologic Fundamentals of Radiation Therapy Ellinger), (Sept.-Oct.) 450
Cancer of Face and Mouth, (Blair, Sherwood, Moore and Byars), (May-June) 269
Carcinoma and Other Malignant Lesions of Stomach (Walters, Gray and Priestley), (Nov.-Dec.) 535
Cineplastic Operations on Stumps of Upper Extremity (Nissen and Bergman), (July-Aug.) 362
Cirurgia especializada (Pavlovsky), July-Aug.) 361
Demonstrations of Physical Signs in Clinical Surgery, (Bailey), (Sept.-Oct.) 450
El Diagnostico de los Tumores Suprarenales (Estrada), (Sept.-Oct.) 450
Eagleton's Index (May-June) 268
Encephalitis (Neal), (May-June) 268
Essentials of General Surgery (Ritchie), (March-Apr.) 182
Foot and Ankle (Lewin), (July-Aug.) 361
Fractures and Dislocations Covering their Pathology, Diagnosis and Treatment (Speed), (Nov.-Dec.) 534
Functional Pathology (Leopold Litchtwitz), (Jan.-Feb.) 94
Hebrew Medical Journal, Vols. 1 and 2 (Moses Einhorn), (March-Apr.) 182
History and Evolution of Surgical Instruments (Thompson), (May-June) 269
Medical Clinics of North America, Vol. 26, No. 3 (Sept.-Oct.) 450
Medical Leaves, Vol. IV (Meyer) 362
Metodos Modernos de Amputação (Vasconcelos), (May-June) 270
Morris' Human Anatomy (Schaeffer), (July-Aug.) 361
Operative Surgery, Including Pre- and Post-Operative Treatment, Principles of Surgical Technic, Blood Transfusion and Abdominal Surgery (F. W. Bancroft), (March-Apr.) .. 181
Oral Surgery (Mead), (May-June) 269

Principles of Neurological Surgery (Davis), (Nov.-Dec.) 535
Rectitis Infiltrativa (Riveros), (Nov.-Dec.)... 534
Short Practice of Surgery (Bailey), (May-June) 270
Skin Grafting (Padgett), (March-Apr.)..... 182
Surgery of Ambulatory Patient (Ferguson), (July-Aug.) 360
Surgery of the Heart (E. S. J. King), (Jan.-Feb.) 94
Surgical Clinics of North America, Vol. 22, No. 2 (May-June) 269
Surgical Reviews of North America (March-Apr.) 182
Synopsis of Genito-urinary Diseases (Dodson), (Jan.-Feb.) 94
Technic of Gastric Operations (Maingot), (May-June) 270
Treatment of Burns (Harkins), (May-June) 269
Urology in War (Bidgood), (July-Aug.)..... 361
Vaginal Hysterectomy (Kennedy and Campbell), (July-Aug.) 360
War Gases (Jacobs), (July-Aug.) 362
Borjas, A.: La enfermedad de Nicholas Favre o cuarta enfermedad venerea: Contribucion al estudio del tratamiento quirurgico de sus localizaciones ano-rectales (Borjas), (Jan.-Feb.)... 50
Brazilian Chapter, formation of (May-June)... 205
Burdenko, Professor Nicolai N. (July-Aug.).... 347
Bustamente, M. E., and Zuckermann, C.: Epidemias de guerra (March-Apr.) 132
Bustos, F. M.: Tetania de la pared abdominal de origen paratiroideo simulando sindromes agudos quirurgicos (July-Aug.) 320

Cancer of larynx, treatment of, in Institute of Experimental Medicine (Roffo and Ferrari), (Sept.-Oct.) 401
Cancer of rectum and rectosigmoid, treatment of (Baehr), (Jan.-Feb.) 45
Carotid artery, internal, and its branches, intracranial aneurysms of (Hamby), (May-June). 216
Castless ambulatory method of treating fractures (Anderson), (Nov.-Dec.) 458
Cataract operation, modified Barraquer suction (Blaess), (March-Apr.) 165
Cervical abscesses, tuberculous, with skin involvement, open surgical treatment of (Bailey), (Sept.-Oct.) 375
Chemotherapy as related to surgery (Jackson), (Nov.-Dec.) 451
Chemotherapy in surgery (Fraser), (Jan.-Feb.) 93
Cirio, C. R.: Miometrectomia (Nov.-Dec.)..... 477
Collapse therapy in treatment of tuberculosis, changing pattern of (Behrend, Custer, Gorman and Behrend), (Jan.-Feb.) 33
Colombian Chapter, formation of (July-Aug.).. 350
Colostomy, left iliac, permanent efficient continuance in (Gonzalez), (Mar.-Apr.) 141
Convocation of Mexican Chapter of International College of Surgeons, (Sept.-Oct.)..... 431
Crossman, L. W., Hurley, V., Warden, C. E., Ruggiero, W., and Allen, F. M.: Refrigeration anesthesia (March-Apr) 125
Crossman, L. W., and Hurley, V.: Embolism of femoral artery: case report (March-Apr.).... 171
Custer, E. W., Behrend, M., Gorman, H. A., and Behrend, A.: Changing pattern of collapse therapy in treatment of tuberculosis (Jan.-Feb.) 33

De Garis, C. F.: Principles of human anatomy (correspondence), (May-June) 267
De Garis, C. F.: Movable joints and joint movements (Sept.-Oct.) 380
De Goycoechea, O. L., and Allende, J. M.: Tratamiento de la pancreatitis aguda (Jan.-Feb.) 19
De Las Casas, H.: Treatment of fractures of femoral neck in aged (March-Apr.) 98
De Muth, O.: Recent developments of biliary surgery (Nov.-Dec.) 481
Diabetes mellitus, suprarenal surgery in relation to (Manzanilla and Garcia), (Nov.-Dec.)... 495
Dicoumarin preparation, use of (McRoberts), (July-Aug.) 277
Dimitry, T. J.: New prothesis and surgery towards prothesis motion (Dimitry), (Jan.-Feb.) 75
Douglass, F. M.: Objectives in surgery of biliary tract (March-Apr.) 135
Duff, J.: Renal neoplasms (July-Aug.) 327
Duodenal and gastrojejunal ulcers, resections of, technical procedures in difficult situations in (Nissen), (Jan.-Feb.) 1

EDITORIALS
Advancement in surgery of stomach in last twenty-five years (March-Apr.) 95
Blood vessel surgery in War (Sept.-Oct.)... 363
Honoris Causa (Sept.-Oct.) 367
Management of acute cholecystitis (Jan.-Feb.) 85
Medical textbook of the future (July-Aug.).. 271
Neurosurgery (May-June) 183
Now (July-Aug.) 276
Prognosis in prostatic carcinoma (Nov.-Dec.) 532
Progress (Sept.-Oct.) 365
Suture instead of ligature of injured blood vessels (July-Aug.) 274
Teaching with films (March-Apr.) 97
Use of cutis graft in general surgery (Nov.-Dec.) 531
Uterus as content of inguinal herniæ in men (Sept.-Oct.) 365
Wound healing — hypoproteininemia (Nov.-Dec.) 530
Einhorn, Max (Biography), (Goldstein), (July-Aug.) 343
Embolism of femoral artery—case report (Crossman and Hurley) (March-Apr.) 171
Epidemics, war (Zuckermann and Bustamente), (Mar.-Apr.) 132
Esophagoplasty, report of author's third case (Fierro), (Sept.-Oct.) 390
Esser, J. F. S.: Biological scrotal flaps—a new approach (March-Apr.) 168

Facial wounds, recent, surgical treatment of (Maltz), (July-Aug.) 334
Femoral artery, embolism of — case report (Crossman and Hurley), (March-Apr.) 171
Femoral neck in aged, treatment of fractures of (De Las Casas), (March-Apr.) 98
Ferrari, R., and Roffo, A. H.: El tratamiento del cancer de la laringe en el instituto de medicina experimental (Sept.-Oct.) 401
Fierro, D. F.: Un tercer caso de esofagoplastia total (Sept.-Oct.) 390
Flothow, P. G.: Observations on herniated discs and hypertrophied ligamentum flavum (May-June) 225

Fractures, castless ambulatory method of treating (Anderson), (Nov.-Dec.) 458
Fractures, compression, of spine (Sammons), (July-Aug.) 300
Fractures of femoral neck in aged, treatment of (De Las Casas), (March-Apr.) 98
Fraser, Sir John: Chemotherapy in surgery (Jan.-Feb.) 93
Freeman, W., and Watts, J. W.: Surgical aspects of prefrontal lobotomy (May-June).... 233

Garcia, A. G.: X-rays in identification (Nov.-Dec. 524
Garcia, F. F., and Manzanilla, M.: Cirugia suprarenal en relacion con la diabetes mellitus (Nov.-Dec.) 495
Gastrojejunal and duodenal ulcers, resections of, technical procedures in difficult situations in (Nissen), (Jan.-Feb.) 1
Gibson, L. V., and Arnold, C. H.: Modification of Smith-Peterson pin (Mar.-Apr.) 180
Goldstein, H. J.: Max Einhorn (July-Aug.).... 343
Gonzalez, R. B.: Colostomia izquierda definitiva (March-Apr.) 141
Gorman, H. A., Behrend, M., Custer, E. W., and Behrend, A.: Changing pattern of collapse therapy in treatment of tuberculosis (Jan.-Feb.) 33
Guild Activities (Jan.-Feb.), ... 88-93
(Mar.-Apr.) 179
(July-Aug.) 348
Guzzetta, A. J.: Pneumatic rupture of intestine (Nov.-Dec.) 522

Hamby, W. B.: Intracranial aneurysms of internal carotid artery and its branches (May-June) 216
Hard-of-hearing, individual audiograms versus mass-testing as means of detecting (Malis), (Nov.-Dec.) 498
Hematoma, subcortical, traumatic (Wilkins), (May-June) 248
Hematoma, subdural (Snodgrass), (May-June) 241
Hepatic duct, muscular system of (Mirizzi), (July-Aug.) 288
Herniated discs and hypertrophied ligamentum flavum, observations on (Flothow) 225
Howser, J. W., and McNealy, R. W.: Perforation in peptic ulcer (Mar.-Apr.) 115
Hudson, O. C.: Lesions of external peroneal nerve (May-June) 223
Hurley, V., and Crossman, L. W.: Embolism of femoral artery—Case report (March-Apr.) 171
Hurley, V., Warden, C. E., Ruggiero, W., Allen, F. M., and Crossman, L. W.: Refrigeration anesthesia (March-Apr.) 125
Hyndman, O. R.: Lissauer's tract section (Sept.-Oct.) 394
Hyndman, O. R.: Tic douloureux (May-June).. 192

iliac colostomy, left, permanent efficient continence in (Gonzalez), (Mar.-Apr.)..... 141
Instruments: Modification of Smith-Peterson pin (Gibson and Arnold), (Mar.-Apr.)..... 180
Intestine, pneumatic rupture of (Guzzetta), (Nov.-Dec. 522
Intestine, small, massive resection of (Pate), (July-Aug) 323
Intracranial aneurysms of internal carotid artery and its branches (Hamby), (May-June)..... 216
Intracranial tumors, reducing operative mortality of (Jaeger), (May-June) 200

Jackson, A. S.: Chemotherapy as related to surgery (Nov.-Dec.) 451
Jaeger, J. R.: Reducing operative mortality of intracranial tumors (May-June) 200
Joints, movable, and joint movements (De Garis), (Sept.-Oct.) 380
Judovich, B. D., and Bates, W.: Scalenus anticus syndrome (Jan.-Feb.) 26

Landes, H. E., and Voris, H. C.: Therapy of neurogenic bladder, (May-June) 206
La Breck, F. A.: Role of new obstetric delivery forceps in mortality (Nov.-Dec.)..... 514
Larynx, Cancer of, treatment of, in Institute of Experimental Medicine (Roffo and Ferrari), (Sept.-Oct. 401
de Las Cases, Herman (biography), (March-Apr.) 174
Ligamentum flavum, hypertrophied, observations on herniated discs and (Flothow), (May-June) 225
Lissauer's tract section (Hyndman), (Sept.-Oct.) 394
Lobotomy, prefrontal, surgical aspects of (Watts and Freeman), (May-June) 233

MacCarty, W. C.: Diagnostic and prognostic surgical pathology (Sept.-Oct.) 369
McNealy, R. W., and Howser, J. W.: Perforation in peptic ulcer (March-Apr.) 115
McRoberts, J. W.: Use of dicoumarin preparation (July-Aug.) 277
Malis, S.: Individual audiograms versus mass-testing as means of detecting hard-of-hearing (Nov.-Dec.) 498
Maltz, M.: Surgical treatment of recent facial wounds (July-Aug.) 334
Mandl, F.: Observations and problems on operations for lesions of semiluner cartilege (Jan.-Feb.) 63
Manzanilla, M. A., and Garcia, F. F.: Cirugia suprarenal en relacion con la diabetes mellitus (Nov.-Dec.) 495
Medical film, international aspects of (July-Aug.) 354
Medical Department of United States Army, organization of (Quade), (Nov.-Dec.) 526
Mexican Chapter, convocation of (Sept.-Oct.) 431- 440
Mexican Chapter, president and vice-president honored (July-Aug.) 352
Mexican Republic, President of, conferring of honorary degree upon (Sept.-Oct.) 436
Mirizzi, P. L.: El sistema del hepatico, su fisiopathologia (July-Aug.) 288
Mortality of intracranial tumors, reducing operative (Jaeger), (May-June) 200
Mortality, role of new obstetric delivery forceps in mortality (La Breck), (Nov.-Dec.) 514
Muscular system of hepatic duct (Mirizzi), (July-Aug.) 288
Myometrectomy (Cirio), (Nov.-Dec.) 477

Neoplasms, renal (Duff), (July-Aug.) 327
Nerve, external peroneal, lesions of (Hudson), (May-June) 223

Neurogenic bladder, therapy of (Voris and Landes), (May-June) 206
Nicholas Favre or fourth venereal disease, contribution to the surgical treatment of anorectal localizations of (Borjas), (Jan.-Feb.).. 50
Nissen, R.: Technical procedures in difficult situations in resections of duodenal and gastrojejunal ulcers (Jan.-Feb.) 1
Noble, Jr., T. B.: Place of plication in treatment of peritonitis (July-Aug.) 313

OBITUARIES
Corachan-Garcia, Manuel (Mar.-Apr.) 176
Kolischer, Gustav (Sept.-Oct.) 430
Simon, Morris (Mar.-Apr.) 177
Westover, Raymond R. (Mar.-Apr.)..... 177
Obstetric delivery forceps in mortality, role of new (La Breck), (Nov.-Dec.) 514

Panamanian Chapter, formation of, (July-Aug.) 352
Pancreatitis, acute, treatment of (Allende and De Goycoechea), (Jan.-Feb.) 19
Parathyroid origin, tetany of abdominal wall of (Bustos), (July-Aug.) 320
Pate, J. C.: Massive resection of small intestine (July-Aug.) 323
Pathology, surgical, diagnostic and prognostic (MacCarty), (Sept.-Oct.) 369
Pentothal sodium intravenous anesthesia (Rudder), (Jan.-Feb.) 69
Peptic ulcer, perforation in (McNealy and Howser), (March.-Apr.) 115
Peritonitis, treatment of, place of plication in (Noble, Jr.), (July-Aug.) 313
Peroneal nerve, external, lesions of (Hudson), (May-June) 223
Pfahler, G. E.: Object and value of pre-operative and post-operative X-ray treatment (Nov.-Dec.) 464
Plication in treatment of peritonitis, place of (Noble, Jr.), (July-Aug.) 313
Prefrontal lobotomy, surgical aspects of (Watts and Freeman), (May-June 233
Pituitary gland transplantation (Wolfsohn), (Nov.-Dec.) 508
President's Page
(Jan.-Feb.) 87
(Mar.-Apr.) 178
(May-June) 252
(July-Aug.) 349
Procurement and assignment service, progress of (Sethman), (July-Aug.) 355
Prothesis, new, and surgery towards prothesis motion (Dimitry), (Jan.-Feb.) 75

Quade, Brig. Gen. O. H.: Organization of Medical Department of United States Army (Nov.-Dec.) 526

Rachmilewitz, M., and Wolman, M.: Effect of sympathectomy on blood volume in thromboangiitis obliterans (Jan.-Feb.) 80
Raney, R. B.: Surgical lesions about spinal canal and significance of character of pain in differential diagnosis and localization (May-June).. 185
Rectum and rectosigmoid, treatment of cancer of (Baehr), (Jan.-Feb.) 45
Refrigeration anesthesia (Allen, Crossman, Hurley, Warden and Ruggiero), (Mar.-Apr.)..... 125
Renal neoplasms (Duff), (July-Aug.) 327
Roffo, A. H., and Ferrari, R.: El tratamiento del cancer de la laringe en el instituto de medicina experimental (Sept.-Oct.) 401
Rudder, F. F.: Pentothal sodium intravenous anesthesia (Jan.-Feb.) 69
Ruggiero, W., Allen, F. M., Crossman, L. W., Hurley, V., and Warden, C. E.: Refrigeration anesthesia (Mar.-Apr.) 125

Sammons, W. P.: Compression fractures of spine (July-Aug.) 300
Scalenus anticus syndrome (Judovich and Bates), (Jan.-Feb.) 26
Scrotal flaps, biological—a new approach (Esser), (Mar.-Apr.) 168
Semilunar cartilage, observations and problems on operation for lesions of (Mandl), (Jan.-Feb.) 63
Sethman, H. T.: Progress of procurement and assignment service (July-Aug.) 359
Smith-Peterson pin, modification of (Gibson and Arnold), (Mar.-Apr.) 180
Snodgrass, S. R.: Subdural hematoma (May-June) 241
Spinal canal, surgical lesions about, and significance of character of pain in differential diagnosis and localization (Raney), (May-June).. 185
Spine, compression fractures of (Sammons), (July-Aug.) 300
Subcortical hematoma, traumatic (Wilkins), (May-June) 248
Subdural hematoma (Snodgrass), (May-June).. 241
Suprarenal surgery in relation to diabetes mellitus (Manzanilla and Garcia), (Nov.-Dec.) 495
Surgical problems, some, of present war (Behrend), (July-Aug.) 308
Sympathectomy, effect of, on blood volume in thrombo-angiitis obliterans (Rachmilewitz and Wolman), (Jan.-Feb.) 80

Tetany of abdominal wall of parathyroid origin (Bustos), (July-Aug.) 320
Thromboangiitis obliterans, effect of sympathectomy on blood volume in (Rachimilewitz and Wolman), (Jan.-Feb.) 80
Tic douloureux (Hyndman), (May-June)..... 192
Tuberculosis, collapse therapy in treatment of, changing pattern of (Behrend, Custer, Gorman and Behrend), (Jan.-Feb.) 33
Tuberculosis, osseous and pulmonary, immobilization by surgery (Albee), (Jan.-Feb.).... 10
Tuberculous cervical abscesses with skin involvement of (Bailey), (Sept.-Oct.) 375
Turkish Chapter, formation of (May-June).... 205

Ulcers, duodenal and gastrojejunal, resections of, technical procedures in difficult situations in (Nissen), (Jan.-Feb.) 1
Ulcer, peptic, perforation in (McNealy and Howser), (Mar.-Apr.) 115
United States Army, organization of medical department of (Quade), (Nov.-Dec.)..... 526
United States Chapter, Sixth Annual Assembly (May-June) 255
United States Chapter, Seventh National Assembly (Sept.-Oct.) 441- 449

Venereal disease, fourth, contribution to surgical treatment of ano-rectal localizations of Nicholas Favre or (Borjas), (Jan.-Feb.).... 50
Venezuelan Chapter, formation of..... 205
Voris, H. C., and Landes, H. E.: Therapy of neurogenic bladder (May-June) 206

War epidemics (Zuckermann and Bustamente), (Mar.-Apr.) 132
Warden, C. E., Ruggiero, W., Allen, F. M., Crossman, L. W., and Hurley, V.: Refrigeration anesthesia (Mar.-Apr.) 125
Watts, J. W., and Freeman, W.: Surgical aspects of prefrontal lobotomy (May-June) 233
Wilkins, H.: Traumatic subcortical hematoma (May-June) 248
Wolfsohn, G.: Pituitary gland transplantation (Nov.-Dec.) 508
Wolman, M. and Rachmilewitz, M.: Effect of sympathectomy on blood volume in thromboangiitis obliterans (Jan.-Feb.) 80
Wounds, recent facial, surgical treatment of (Maltz), (July-Aug.) 334

X-ray treatment, pre-operative and post-operative, object and value of (Pfahler), (Nov.-Dec.) 464
X-rays in identification (Garcia), (Nov.-Dec.).. 524

Zuckermann, C., and Bustamente, M. E.: Epidemias de guerra (March-Apr.) 132

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INDEX TO ADVERTISERS

Abbott Laboratories.....Outside Back Cover
A. S. Aloe Co.....VI
Anglo-French Laboratories, Inc.....Inside Front Cover
Bishop Laboratories VI
Clay-Adams Co., Inc.....XI
Cook County Graduate School.....VII
Everest and Jennings.....VII
Hoffmann-La Roche, Inc.....VIII
J. B. Lippincott Co.....V
Massillon Rubber Co.....XI
Riedel-de Haen, Inc.....Inside Back Cover
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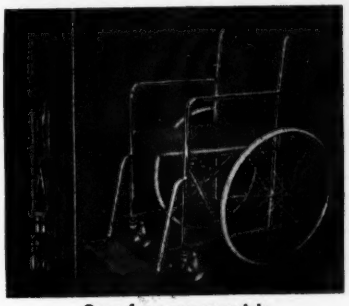

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